Nucleus Nucleus 2015

Report of Contributions

https://agenda.infn.it/e/5235

Contribution ID: **1** Type: **Oral presentation**

Ab-initio calculation of nuclear structure with many-body perturbation theory

Tuesday, June 23, 2015 6:50 PM (20 minutes)

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Word , <a href=”https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235”>Lat**

Starting from realistic nuclear forces (N3LO [1] and JISP16 [2]), we perform the Hartree-Fock approximation first. Taking the HF solution as the reference and using many-body perturbation theory (MBPT) [3], we make corrections to the HF calculation, up to the third-order correction in nuclear energy and up to the second order in nuclear radius. As preliminary calculations, we have investigated the closed-shell nuclei, 4He and 16O, obtaining quite good results in both binding energies and radii. Further work is in process.

We thank J. Vary for providing the JISP16 interaction and useful discussions.

References:

[1] D.R. Entem and R. Machleidt, Phys. Rev. C 68, 041001 (32003).
[2] A.M. Shirokov, A.I. Mazur, S/A. Zaytsev, J.P. Vary and T.A. Weber, Phys. Rev. C 70, 044005 (2004).
[3] I. Shavitt and R.J. Bartlett, Many-body methods in Chemistry and physics: MBPT and coupled-cluster theory (2009).

Primary author: Prof. XU, Furong (State Key Laboratory of Nuclear Physics and Technology, School of Physics, Peking University, Beijing, China)

Co-author: Mr HU, Baishan (State Key Laboratory of Nuclear Physics and Technology, School of Physics, Peking University, Beijing, China)

Presenter: Prof. XU, Furong (State Key Laboratory of Nuclear Physics and Technology, School of Physics, Peking University, Beijing, China)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **2** Type: **Oral presentation**

MCNP6 Simulation of Light and Medium Nuclei Fragmentation at Intermediate Energies

Tuesday, June 23, 2015 3:40 PM (20 minutes)

Primary author: Prof. MASHNIK, Stepan (Los Alamos National Laboratory, USA)

Co-author: Ms KERBY, Leslie (Los Alamos National Laboratory & University of Idaho, USA)

Presenter: Prof. MASHNIK, Stepan (Los Alamos National Laboratory, USA)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **3** Type: **Oral presentation**

Measurements of the 6He+p Resonant Scattering

Primary author: Dr PAMPA CONDORI, Rubén (Instituto de Física da Universidade de São Paulo, Brazil)

Presenter: Dr PAMPA CONDORI, Rubén (Instituto de Física da Universidade de São Paulo, Brazil)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **5** Type: **Invited talk - Plenary Session**

Alpha-Photon Decay Spectroscopy of Element 115

Monday, June 22, 2015 9:15 AM (30 minutes)

Presenter: Prof. RUDOLPH, Dirk (Lund University, Sweden)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **6** Type: **Invited talk - Plenary Session**

Inverse quasi-fission phenomena in heavy ion collisions

Monday, June 22, 2015 9:45 AM (30 minutes)

Presenter: Dr KOZULIN, EDUARD (Flerov Laboratory of Nuclear Reactions, JINR, Dubna, Russia)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **7** Type: **Invited talk - Plenary Session**

Nuclear Structure Studies of the Heaviest Elements by High-Precision Mass Measurements

Monday, June 22, 2015 10:15 AM (30 minutes)

Presenter: BLOCK, Michael (GSI, Darmstadt, Germany)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **8** Type: **Invited talk - Plenary Session**

SHE at RIKEN

Monday, June 22, 2015 10:45 AM (30 minutes)

Presenter: MORITA, K. (RIKEN, Japan)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **9** Type: **Invited talk - Plenary Session**

Intermediate energy nuclear reactions

Monday, June 22, 2015 11:45 AM (30 minutes)

Presenter: Prof. SHYAM, Radhey (Saha Institute of Nuclear Physics, Kolkata, India)

Session Classification: QCD and Hadron Physics

Contribution ID: **10** Type: **Invited talk - Plenary Session**

Experimental Highlights on QCD Medium Properties at RHIC

Monday, June 22, 2015 12:15 PM (30 minutes)

Presenter: NOUICER, Rachid (Brookhaven National Laboratory, Upton, USA)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **11** Type: **Invited talk - Plenary Session**

Light Nuclei and Hypernuclei from Lattice QCD

Monday, June 22, 2015 12:45 PM (30 minutes)

Presenter: PARRENO, A. (Universitat de Barcelona, Spain)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **13** Type: **Invited talk - Plenary Session**

Studying the Quark-Gluon Plasma in Nuclear Collisions at the LHC

Tuesday, June 23, 2015 8:30 AM (30 minutes)

Presenter: Prof. STACHEL, Johanna (Universitaet Heidelberg, Germany)

Session Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **14** Type: **Invited talk - Plenary Session**

Collective dynamics, fluctuations and instabilities in Relativistic Heavy Ion collisions

Tuesday, June 23, 2015 9:00 AM (30 minutes)

Presenter: Prof. CSERNAI, Laszlo (University of Bergen, Norway)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **15** Type: **Invited talk - Plenary Session**

Understanding properties of the Quark Gluon Plasma (QGP) on the basis of correlation and fluctuation measurements at RHIC and the LHC

Tuesday, June 23, 2015 9:30 AM (30 minutes)

Presenter: Prof. BELLWIED, Rene (University of Houston, Houston, USA)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **16** Type: **Invited talk - Plenary Session**

Recent Results from Beam Energy Scan at RHIC

Presenter: LUO, Xu (Central China Normal University, Wuhan, China)

Contribution ID: **17** Type: **Invited talk - Plenary Session**

Shape phase transitions far from stability

Tuesday, June 23, 2015 11:00 AM (30 minutes)

Presenter: Prof. VRETENAR, Dario (University of Zagreb, Croatia)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **18** Type: **Invited talk - Plenary Session**

Time-dependent Hartree-Fock calculations for multinucleon transfer and quasi-fission processes

Tuesday, June 23, 2015 11:30 AM (30 minutes)

Presenter: YABANA, Kazuhiro (Center for Computational Sciences, University of Tsukuba, Japan)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **19** Type: **Invited talk - Plenary Session**

Interplay between collective and single particle excitations around neutron-rich doubly-magic nuclei

Tuesday, June 23, 2015 12:00 PM (30 minutes)

Presenter: LEONI, Silvia (University of Milano and INFN, Italy)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **20** Type: **Invited talk - Plenary Session**

Heavy ion charge exchange reactions

Tuesday, June 23, 2015 12:30 PM (30 minutes)

Presenter: UESAKA, Tomohiro (RIKEN Nishina Center, Saitama, Japan)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **21** Type: **Invited talk - Plenary Session**

Reaction theory: status and perspectives

Wednesday, June 24, 2015 11:00 AM (30 minutes)

Presenter: MORO, Antonio (University of Seville, Spain)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **22** Type: **Invited talk - Plenary Session**

Broad resonances in 8Be, 12C and 16O studied with reactions and beta-decay

Wednesday, June 24, 2015 11:30 AM (30 minutes)

Presenter: FYNBO, Hans Otto Uldall (University of Aarhus, Denmark)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **23** Type: **Invited talk - Plenary Session**

Continuum spectroscopy of light nuclei

Wednesday, June 24, 2015 12:00 PM (30 minutes)

Presenter: Prof. CHARITY, Robert (Washington University, USA)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **24** Type: **Invited talk - Plenary Session**

Nuclear structure and reaction studies with Fermionic Molecular Dynamics

Wednesday, June 24, 2015 12:30 PM (30 minutes)

Presenter: Dr NEFF, Thomas (GSI Darmstadt, Germany)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **25** Type: **Invited Talk - Parallel Session**

Effect of ^{6}Li resonances on near-barrier elastic scattering for reactions with several spherical targets

Thursday, June 25, 2015 5:00 PM (25 minutes)

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\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

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\begin{center}
{\large \bf Effect of ^{6}Li resonances on near-barrier elastic scattering
for reactions with several spherical targets}
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\begin{center}
%
\underline{A. G\'{o}mez Camacho}[1], A. Diaz-Torres[2], P.R.S. Gomes[3] and J. Lubian[3]
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1]Departamento de Aceleradores\\
Instituto Nacional de Investigaciones Nucleares\\
Apartado Postal 18-1027, C.P. 11801, M\'{e}xico City, M\'{e}xico} \\
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and Related Areas,\\
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{\em [3]Instituto de Fisica, Universidade Federal Fluminense.\\
Avenida Litoranea s/n, Gragoat\'{a}, Niter\'{o}i RJ 24210-340, Brazil}
\end{center}

% write your abstract here
Calculations of elastic scattering angular distributions for reactions of

the weakly bound projectile ^{6}Li with targets ^{28}Si, ^{58}Ni, ^{144}Sm and ^{208}Pb at energies just above the Coulomb barrier are performed with the continuum-discretized coupled-channel calculation method. Ground, resonant and non-resonant continuum states of ^{6}Li are included in the convergent calculations. The effect of the resonances on elastic scattering angular distributions is studied, in an original procedure, by excluding from the continuum space those states corresponding to the resonances. When the resonances of ^{6}Li are considered, the calculated elastic scattering angular distributions are in good agreement with the measurements. The exclusion of the resonances produces a small effect for the light targets, however the effect increases for the heavier systems. Calculation of the polarization potentials associated with the resonances show that they have a repulsive character at the long range region, where scattering occurs. It is also confirmed that couplings to continuum states of ^{6}Li are essential to achieve agreement with the data.

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[1] Y. Sakuragi, M. Yahiro, M. Kamimura, Prog. Theor. Phys. Suppl. \textbf{89}, 1 (1986).

[2] N. Austern, Y. Iseri, M. Kamimura, M. Kawai, G. Rawitscher, M. Yahiro, Phys. Rep. \textbf{154}, 125 (1987).

[3] Y. Sakuragi, M. Yahiro, M. Kimimura, Prog. Theor. Phys. \textbf{68}, 322 (1982).

[5] A. D\'{\i}az-Torres, I.J. Thompson, C. Beck, Phys. Rev. C \textbf{68}, 044607 (2003).

[6] C. Beck, N. Keeley, A. Diaz-Torres, Phys. Rev. C \textbf{75}% , 054605 (2007).

[7] K.Rusek, N.Keeley, A.Pakou, N.Alamanos, Nucl. Phys. A \textbf{784}, 13 (2007).

[8] D.R. Otomar, J. Lubian, P.R.S. Gomes, Eur. Phys. J. A. \textbf{46}, 285 (2010).

[9] I.J. Thompson \emph{et al}., Nucl. Phys. A \textbf{505}, 84 (1989).

\end{document}

Primary author: Dr GOMEZ CAMACHO, Arturo (Instituto Nacional de Investigaciones Nucleares, Mexico City, Mexico)

Co-authors: Dr DÍAZ TORRES, Alexis (European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento Italy); Dr LUBIAN, Jesus (Instituto de Fisica, Universidade Federal Fluminense, Niteroi, Brazil); Dr GOMES, Paulo (Instituto de Fisica, Universidade Federal Fluminense, Niteroi, Brasil)

Presenter: Dr GOMEZ CAMACHO, Arturo (Instituto Nacional de Investigaciones Nucleares, Mexico City, Mexico)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **26** Type: **Invited talk - Plenary Session**

Constraints on the asymmetric EOS from Heavy Ion Reactions

Thursday, June 25, 2015 8:30 AM (30 minutes)

Presenter: YENNELLO, Sherry (Texas A&M University, USA)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **27** Type: **Invited talk - Plenary Session**

Recent results on light nuclear systems; progress and problems

Thursday, June 25, 2015 9:00 AM (30 minutes)

Presenter: FREER, Martin (University of Birmingham, UK)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **28** Type: **Invited talk - Plenary Session**

Pairing effects in nuclear reactions

Thursday, June 25, 2015 9:30 AM (30 minutes)

Presenter: Dr LACROIX, Denis (IPN Orsay, France)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **29** Type: **Invited talk - Plenary Session**

Cluster production within transport theory

Thursday, June 25, 2015 10:00 AM (30 minutes)

Presenter: ONO, Akira (Tohoku University, Sendai, Japan)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **30** Type: **Invited talk - Plenary Session**

Present status of coupled-channels calculations for heavy-ion subbarrier fusion reactions

Thursday, June 25, 2015 11:00 AM (30 minutes)

Presenter: Dr HAGINO, Kouichi (Tohoku University, Sendai, Japan)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **31** Type: **Invited talk - Plenary Session**

Sub- and near-barrier fusion reactions: experimental results

Thursday, June 25, 2015 11:30 AM (30 minutes)

Presenter: MONTAGNOLI, Giovanna (INFN-Sezione di Padova, Italy)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **32** Type: **Invited talk - Plenary Session**

Quantifying low-energy fusion dynamics of weakly bound nuclei

Thursday, June 25, 2015 12:00 PM (30 minutes)

Presenter: Dr DIAZ-TORRES, ALEXIS (ECT*, Trento, Italy)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **33** Type: **Invited talk - Plenary Session**

Dynamical effects in fission reactions investigated at high excitation energy

Thursday, June 25, 2015 12:30 PM (30 minutes)

Presenter: Prof. BENLLIURE, Jose (University of Santiago de Compostela,Spain)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **34** Type: **Invited talk - Plenary Session**

Reaction models in nuclear astrophysics

Friday, June 26, 2015 8:30 AM (30 minutes)

Presenter: Dr DESCOUVEMONT, Pierre (Universite Libre de Bruxelles, Belgium)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **35** Type: **Invited talk - Plenary Session**

Indirect methods in nuclear astrophysics

Friday, June 26, 2015 9:00 AM (30 minutes)

Presenter: Prof. MUKHAMEDZHANOV, Akram (Texas A&M University, USA)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **37** Type: **Invited talk - Plenary Session**

Where is the site of the r-process?

Friday, June 26, 2015 9:30 AM (30 minutes)

Presenter: APRAHAMIAN, Ani (University of Notre Dame, USA)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **38** Type: **Invited talk - Plenary Session**

Present and future of RIB facilities in Europe

Friday, June 26, 2015 11:00 AM (30 minutes)

Presenter: Dr LEWITOWICZ, Marek (GANIL, Caen, France)

Session Classification: New Facilities and Detectors

Contribution ID: **39** Type: **Invited talk - Plenary Session**

Time Projection Chambers to probe Nuclear Reactions

Friday, June 26, 2015 11:30 AM (30 minutes)

Presenter: Prof. TSANG, Betty (Michigan State University, USA)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **40** Type: **Invited talk - Plenary Session**

Research at the future facility Extreme Light Infrastructure - Nuclear Physics (ELI-NP)

Friday, June 26, 2015 12:00 PM (30 minutes)

Presenter: ZAMFIR, Victor (National Institute for Physics and Nuclear Engineering, Bucharest--Magurele, Romania)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **41** Type: **Invited talk - Plenary Session**

Radioactive ion beam factory at RIKEN

Friday, June 26, 2015 12:30 PM (30 minutes)

Presenter: EN'YO, Hideto (RIKEN Nishina Center for Accelerator-Based Science, Wako-Saitama, Japan)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **42** Type: **Poster**

Transverse Isotropy: Disappearance of Mott oscillations in sub-barrier elastic scattering of identical heavy ions

Primary author: Prof. HUSSEIN, Mahir (Universidade de Sao Paulo, Brazil)

Co-authors: Prof. CANTO, L. Felipe (Universidade Federal do Rio de Janeiro); Prof. DONANGELO, Raul (Facultad de Ingenier´ıa)

Presenter: Prof. HUSSEIN, Mahir (Universidade de Sao Paulo, Brazil)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **43** Type: **Invited Talk - Parallel Session**

Low-energy ^{9}Be+^{208}$Pb scattering, breakup and fusion within a four-body model

Thursday, June 25, 2015 5:25 PM (25 minutes)

Primary author: Prof. HUSSEIN, Mahir (Universidade de Sao Paulo, Brazil)

Co-authors: Prof. CANTO, L. Felipe (Universidade Federal do Rio de Janeiro); Prof. DESCOUVEMONT, Pierre (Universit\'e Libre de Bruxelles (ULB)); Dr DRUET, T. (Universit\'e Libre de Bruxelles (ULB))

Presenter: Prof. HUSSEIN, Mahir (Universidade de Sao Paulo, Brazil)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **44** Type: **Poster**

Dynamics of fragmentation in heavy-ion collisions at intermediate energies

Primary author: Ms BANSAL, Preeti (Panjab University Chandigarh INDIA)

Co-authors: Mr KUMAR, Rohit (Panjab University Chandigarh); Dr GAUTAM, Sakshi (Panjab University Chandigarh, India)

Presenter: Dr GAUTAM, Sakshi (Panjab University Chandigarh, India)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **45** Type: **Invited Talk - Parallel Session**

Nuclear matter under extreme conditions and finite nuclei with finite range simple effective interaction

Tuesday, June 23, 2015 2:55 PM (25 minutes)

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Nuclear matter under extreme conditions and finite nuclei with finite range simple effective interaction

T. R. Routray1, X. Viñas2, M. Centelles2, L.M. Robledo3, B. Behera1
1School of Physics, Sambalpur University, Burla, Sambalpur, Odisha, India, Pin: 768019; 2 Facultat de Fisica, Departament D’ Estructura i Constituents de la Materia, Universitat de Barcelona, Diagonal 645, E-08028, Barcelona, Spain ; 3 Dep.Física Teórica (Módulo 15), Universidad Autónoma de Madrid, E-8049 Madrid, Spain

The study of nuclear phenomena from finite nuclei to nuclear matter under extreme conditions in a given model is an area of current nuclear research interest. In the present work we have made such an attempt within the framework of non-relativistic mean field theory using the finite range simple effective interaction (SEI). At difference with other effective interactions of Skyrme and Gogny type, almost all the parameters of the SEI (ten of eleven) are fitted in symmetric nuclear matter and pure neutron matter using informations coming from optical model analysis of scattering data at intermediate energies, transport model analysis of flow data in heavy-ion collisions, thermal evolution of nuclear matter properties and constraints from the neutron star mass measurements and cooling phenomenology [1]. Under this protocol of fixation of parameters, it is possible to vary the density dependence of the equation of state (EOS) of isospin asymmetric nuclear matter (ANM) leaving the momentum dependence of the mean field unchanged. This may provide a theoretical advantage in the analysis of heavy-ion collision data in transport model calculations [2]. The high density behavior of symmetry energy predicted, within this protocol of parameter determination, is neither stiff nor very soft. The mass-radius relation, direct URCA process and crust-core transition density in neutron stars are studied with the SEI. The influence of the presence of hyperons in the core is also examined.

Using the SEI and the Extended Thomas-Fermi expansion of the density matrix [3], a local Energy Density Functional is derived to study finite nuclei [4]. This Energy Density Functional has only an additional open parameter, which is fixed from the binding energy of the doubly closed shell magic nucleus 40Ca, plus the strength of the spin-orbit force which is determined from the binding energy of the nucleus 208Pb . With this formalism the binding energies and radii of 161 even-even spherical nuclei reproduced the experimental values with root mean square (rms) deviations 1.5 MeV and 0.015 fm , respectively. These results are of a quality similar to the one found using traditional interactions [5]. This formalism also predicts the kink in 208Pb in the charge radii of lead isotopes. Study of the deformation properties predicted by the SEI in finite nuclei using the Hartree-Fock-Bogoliubov (HFB) formalism are underway and preliminary results obtained are encouraging.

[1] B. Behera , T. R. Routray , A Pradhan , S. K. Patra and P. K. Sahu (2007) Nucl. Phys. A 794 132

[2] . J. Rizzo, M. Colonna, M. Di Toro and V. Greco (2004) Nucl. Phys. A 732 202
[3] V.B. Soubbotin and X.Viñas (2000) Nucl.Phys. A665 291; V.B. Soubbotin, V.I. Tselyaev and X. Viñas 2003) Phys.Rev. C67 014324
[4] B. Behera, X. Viñas, M. Bhuyan, T.R. Routray, B.K. Sharma and S.K. Patra (2013) J. Phys. G: Nucl. Part. Phys 40 095105; B. Behera . X. Viñas, T. R. Routray and M. Centeles (2015) J. Phys. G: Nucl. Part. Phys. (in press)
[5] M. Baldo, P. Schuck and X. Viñas (2008) Phys. Lett. B 663 390

Primary author: Prof. ROUTRAY, Tusar Ranjan (Sambalpur University, India)

Co-authors: Prof. BEHERA, B. (Sambalpur University); Prof. REBLEDO, L. M. (Universidad Autónoma de Madrid); Dr CENTELLES, Mario (Universitat de Barcelona); Prof. VIÑAS, Xavier (Universitat de Barcelona)

Presenter: Prof. ROUTRAY, Tusar Ranjan (Sambalpur University, India)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **46** Type: **Invited talk - Plenary Session**

Keynote Talk

Monday, June 22, 2015 8:45 AM (30 minutes)

Presenter: BRACCO, Angela (INFN and University of Milano, Italy)

Session Classification: Keynote Talk

Contribution ID: **47** Type: **Invited talk - Plenary Session**

Summary Talk

Friday, June 26, 2015 1:00 PM (30 minutes)

Presenter: MOTOBAYASHI, Toru (RIKEN Nishina Center, Saitama, Japan)

Contribution ID: **48** Type: **Oral presentation**

Special Features of Nuclear Reactions Induced by Loosely Bound Nuclei

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Reactions involving loosely bound nuclei and occurring at energies in the vicinity of the Coulomb barrier height have many special features that have vigorously been discussed in recent years in a number of studies (see, for example, [1, 2]). These features include the the enhancement of interaction cross sections in the subbarrier energy region. This effect is
especially pronounced for clustering nuclei (for example, 6,7,9Li) [3], as well as neutron-halo nuclei (for example, 6He) [4]. Transfer, breakup, and complete fusion reactions are dominant interaction channels for such nuclei. Processes in which the breakup of loosely bound nuclei in the field of a heavy nucleus is followed by the fusion of the residual nucleus with the target
nucleus have been the subject of numerous theoretical and experimental investigations.
Excitation functions are measured for complete-fusion and transfer reactions induced by the interaction of d, 6,8He and 6,9Li with 206Pb, 209Bi, and Pt. Data obtained for fusion reactions induced by 6,8He ions deviate from the predictions of the statistical model of compound-nucleus decay at projectile energies in the vicinity of the Coulomb barrier height. A strong enhancement of cross sections for fusion reactions induced by the interaction of 6,8He with target nuclei is observed. The cross sections for reactions of cluster transfer, neutron transfer from 3, 6, 8He, and deuteron transfer from 6,9Li at deep-subbarrier energies are also found to be enhanced. These results are discussed from the point of view of the effect of the cluster structure of nuclei on the interaction probability at energies in the vicinity of the Coulomb barrier height.
We are going to measure total reaction cross sections and cross sections for cluster-transfer reactions in the subbarrier energy region.
The results of the present study are of paramount importance for solving astrophysical problems—in particular, for obtaining deeper insight into the mechanism of the production of light elements in the Universe.

REFERENCES

1. L. F. Canto et al., Phys. Rep. 424, 1 (2006).
2. N. Keely et al., Prog. in Part. Nucl. Phys. 59, 579 (2007).
3. M. Dasgupta et al., Phys. Rev. C 66, 041602R (2002).
4. Yu. E. Penionzhkevich , Physics of Atomic Nuclei, Vol. 72, No. 10,1617 (2009)

Primary author: Prof. PENIONZHKEVICH, yuri (Joint Institute for Nuclear Research, Dubna, Russia)

Presenter: Prof. PENIONZHKEVICH, yuri (Joint Institute for Nuclear Research, Dubna, Russia)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **49** Type: **Invited talk - Plenary Session**

Recent developments in Nuclear Physics tools and techniques applied to nuclear energy

Wednesday, June 24, 2015 8:30 AM (30 minutes)

Presenter: Dr LERAY, Sylvie (CEA Saclay, France)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **50** Type: **Invited talk - Plenary Session**

Nuclear Physics and Particle Therapy

Wednesday, June 24, 2015 9:00 AM (30 minutes)

Presenter: BATTISTONI, Giuseppe (INFN-Sezione di Milano, Italy)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **52** Type: **Oral presentation**

PERSPECTIVE STUDY OF EXOTICS AND BARYONS WITH CHARM AND STRANGENESS

Monday, June 22, 2015 4:05 PM (20 minutes)

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The spectroscopy of exotics states with hidden charm together with the spectroscopy of charmed and strange baryons is discussed. It is a good testing tool for the theories of strong interactions, including: QCD in both the perturbative and non-perturbative regimes, LQCD, potential models and phenomenological models [1, 2, 3]. An understanding of the baryon spectrum is one of the primary goals of non-perturbative QCD. In the nucleon sector, where most of the experimental information is available, the agreement with quark model predictions is astonishingly small, and the situation is even worse in the strange and charmed baryon sector. The experiments with antiproton-proton annihilation and proton-proton collisions are well suited for a comprehensive baryon spectroscopy program, in particular, in the spectroscopy of strange and charmed baryons. Charmed and strange baryons can be produced abundantly in both processes, and their properties can be studied in detail [1, 2, 3]. This gives a possibility to get information about their structure and nucleon-hyperon and hyperon-hyperon interaction.
For this purpose an elaborated analysis of charmed hybrids and tetraquark spectrum together with spectrum of charmed and strange baryons is given. The recent experimental data from different collaborations (BES, BaBar, Belle, LHCb, CDF, D0) are analyzed. The attempts of their possible interpretation are considered [4, 5]. Some of these states can be interpreted as higher-lying charmonium and tetraquarks with a hidden charm. It has been shown that charge/neutral tetraquarks must have their neutral/charged partners with mass values which differ by few MeV. This hypothesis coincides with that proposed by Maiani and Polosa [6]. Many heavy baryons with charm and strangeness are expected to exist. But much more data on different decay modes are needed before firmer conclusions can be made. These data can be derived directly from the experiments using a high quality antiproton beam with momentum up to 15 GeV/c planned at FAIR and proton-proton collisions with momentum up to 26 GeV/c planned at the superconducting accelerator complex NICA that is being built in Dubna nowadays.

[1] W. Erni et al., arXiv:0903.3905v1 [hep-ex] (2009) 63

[2] N. Brambilla et al., European Physical Journal C 71:1534, (2011) 1

[3] J. Beringer et al., Review of Particle Physic, Physical. Review, D 86, (2012)

[4] M.Yu. Barabanov, A.S. Vodopyanov, Physics of Particles and Nuclei Letters, V.8, N.10, (2011) 1069

[5] M.Yu. Barabanov, A.S. Vodopyanov, S.L. Olsen, Physics of Atomic Nuclei, V.77, N.1, (2014) 126

[6] N. Drenska, R. Faccini, A.D. Polosa, arXiV:0902.2803v2 [hep-ph] (2009)

Primary author: Dr BARABANOV, Mikhail (Joint Institute for Nuclear Research, Dubna, Russia)

Co-authors: Prof. VODOPYANOV, Alexander (Joint Institute for Nuclear Research); Prof. OLSEN, Stephen (Center for Underground Physics, Institute of Basic Science)

Presenter: Dr BARABANOV, Mikhail (Joint Institute for Nuclear Research, Dubna, Russia)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **54** Type: **Oral presentation**

In-medium and isospin effects of strange particles in heavy-ion

Monday, June 22, 2015 4:25 PM (20 minutes)

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Dynamics of strange particles produced in proton induced nuclear reactions and in heavy-ion collisions near threshold energies has been investigated within the Lanzhou quantum molecular dynamics (LQMD) transport model[1]. The in-medium modifications on particle production in dense nuclear matter are considered through corrections on the elementary cross sections via the effective mass and the mean-field potentials. A repulsive kaon-nucleon potential is implemented in the model through fitting the flow data and inclusive spectra in heavy-ion collisions, which enhances the energetic kaon emission squeezed out in the reaction zone and leads to a variation of the high-momentum spectrum of the K0/K+ yields. It is found that the stiffness of nuclear symmetry energy plays a significant role on the isospin ratio with decreasing the incident energy and a hard symmetry energy has a larger value of the K0/K+ ratio in the domain of subthreshold energies. The attractive antikaon-nucleon potential enhances the subthreshold K production and also influences the structure of inclusive spectra. The strangeness production is strongly suppressed in proton induced reactions in comparison to heavy-ion collisions. The kaon-nucleon and antikaon-nucleon potentials change the structures of rapidity and transverse momentum distributions, and also the inclusive spectra[2]. The measured data from KaoS collaboration have been well explained with inclusion of the in-medium potentials.

[1] Z. Q. Feng, Phys. Rev. C 83, 067604 (2011); 84, 024610 (2011); 85, 014604 (2012); Nucl. Phys. A 878, 3 (2012); Phys. Lett. B 707, 83 (2012).
[2] Z. Q. Feng, Phys. Rev. C 87, 064605 (2013); Z. Q. Feng, Wen-Jie Xie, Gen-Ming Jin, 90, 064604 (2014).

Primary author: Dr FENG, Zhaoqing (Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou , China)

Presenter: Dr FENG, Zhaoqing (Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou , China)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **55** Type: **Poster**

Clustering features of light neutron-deficient nuclei in diffractive dissociation

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Nuclear track emulsion (NTE) is still retaining its exceptional position as a means for studying the structure of diffractive dissociation of relativistic nuclei owing to the completeness of observation of fragment ensembles and owing to its record spatial resolution. Separation of products of fragmentation and charge-exchange reactions of accelerated stable nuclei make it possible to create beams of radioactive nuclei. A unification of the above possibilities extends the investigation of the clustering phenomena in light radioactive proton-rich nuclei. Conclusions concerning clustering features are based on the probabilities for observing of dissociation channels and on measurements of angular distributions of relativistic fragments.
At the JINR Nuclotron exposures of NTE stacks of (NTE) are performed at energy above 1 A GeV to the beams of isotopes Be, B, B, C and N, including radioactive ones [1]. In general, the results confirm the hypothesis that the known features of light nuclei define the pattern of their relativistic dissociation. The probability distributions of the final configuration of fragments allow their contributions to the structure of the investigated nuclei to be evaluated. These distributions have an individual character for each of the presented nuclei appearing as their original "autograph". The nuclei themselves are presented as various superpositions of light nuclei-cores, the lightest nuclei-clusters and nucleons. Recent data on pattern of diffractive dissociation of the nuclei 9C, 10C, 11C and 12N will be discussed in this context.

1. P. I. Zarubin // Lect. Notes in Phys, Springer, 875, 51(2013); arXiv:1309.4881.

Primary author: Dr ZARUBIN, Pavel (Joint Institute for Nuclear Research, Dubna, Russia)

Presenter: Dr ZARUBIN, Pavel (Joint Institute for Nuclear Research, Dubna, Russia)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **57** Type: **Poster**

Recent applications of nuclear track emulsion

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Featuring excellent sensitivity and spatial resolution nuclear track emulsion (NTE) maintains a position of universal and inexpensive detector for survey and exploratory research (http://becquerel.jinr.ru/). Automatic microscopes will enable one to approach at a new level to application of NTE.
Cluster aspects of structure of light nuclei are investigated in fragmentation of nuclei with energy 1.2 A GeV are studied in NTE exposed to secondary beams of the JINR Nuclotron. The charge topology of 11C dissociation is presented and compared with data on the nuclei 7Be, 8,10B, 9,10C and 14N. Probabilities of occurrence of a variety of ensembles of fragments allow one to reveal their structural weights.
When testing the novel NTE a variety of physics tasks related with measurements of alpha-particle tracks were addressed. Decays of stopped 8He nuclei, breaking-ups of 12C nuclei by thermonuclear neutrons are analyzed. Splittings induced by thermal neutrons are studied in boron enriched emulsion. NTE exposed to mu-mesons at CERN.
There arises a problem calibration of ranges of heavy ions for ternary fission studies For this purpose Kr and Xe ions are implanted into emulsion at the JINR cyclotrons. Progress of analysis of NTE samples exposed to Am and Cf sources is presented.

Primary author: Dr ZARUBIN, Pavel (Joint Institute for Nuclear Research, Dubna, Russia)

Co-author: Ms ZARUBINA, Irina (JOINT INSTITUTE FOR NUCLEAR RESEARCH, Dubna, Russia)

Presenters: Ms ZARUBINA, Irina (JOINT INSTITUTE FOR NUCLEAR RESEARCH, Dubna, Russia); Dr ZARUBIN, Pavel (Joint Institute for Nuclear Research, Dubna, Russia)

Track Classification: New Facilities and Detectors

Contribution ID: **58** Type: **Invited talk - Plenary Session**

Recent trends in applications of nuclear techniques to Cultural Heritage

Wednesday, June 24, 2015 9:30 AM (30 minutes)

Presenter: MANDO', Pier Andrea (INFN & Univ. of Florence, Italy)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **59** Type: **Oral presentation**

Nuclear magics at explosive magnetization

Thursday, June 25, 2015 4:05 PM (20 minutes)

Primary author: Prof. KONDRATYEV, Vladimir (National Taras Shevchenko University of Kyiv, Ukraine)

Presenter: Prof. KONDRATYEV, Vladimir (National Taras Shevchenko University of Kyiv, Ukraine)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **61** Type: **Oral presentation**

Role of isospin degree of freedom and model ingredients on the production of light particles and entropy

Primary author: Ms KAUR, Sukhjit (Panjab University, Chandigarh, India)

Presenter: Ms KAUR, Sukhjit (Panjab University, Chandigarh, India)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **63** Type: **Oral presentation**

Breakup of weakly bound nuclei and its influence on fusion

Tuesday, June 23, 2015 5:25 PM (20 minutes)

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In this talk it will be discussed some important features of the breakup of weakly bound nuclei, at energies close to the Coulomb barrier, and its effect on the fusion cross section. Contrary to what was assumed for a long time, recently it has been observed experimentally that at sub-barrier energies transfer processes followed by the breakup of stable weakly bound projectile predominates over the direct breakup. It will be shown how important is the interference between the nuclear and Coulomb components of the breakup and how the cross sections of these components increase when the target mass or charge increases. The effects of the breakup on the fusion cross section are of static and dynamical types, which nowadays can be disentangled. Recent systematic results have shown that the dynamics effects due to breakup and transfer processes enhance the complete fusion cross section at sub-barrier energies and suppress it at energies above the barrier for stable and neutron-halo nuclei. Some controversy exists for the fusion of proton-halo nuclei. The presently available results for the suppression factor of the complete fusion, for a given stable weakly bound projectile, seem to be independent of the target. It will be discussed whether this behaviour is due to the predominance of delayed breakup, which can not affect fusion, or simply because this conclusion was obtained from systematic results including only relatively heavy targets, or both of them. Some experimental challenges and the main open aspects in this field will also be discussed.

Primary author: Prof. GOMES, Paulo R S (Universidade Federal Fluminense, Brazil)

Presenter: Prof. GOMES, Paulo R S (Universidade Federal Fluminense, Brazil)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **64** Type: **Oral presentation**

Charge-Changing Cross Section Measurement of Neutron-rich Carbon Isotopes at 50A MeV

Tuesday, June 23, 2015 6:05 PM (20 minutes)

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{\large \bf Charge-Changing Cross Section Measurement of Neutron-rich Carbon Isotopes at 50A MeV}
\end{center}

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% insert the authors here. The presenter is underlined
\underline{D. T. Tran}[1,2], T. T. Nguyen[2,3,4], I. Tanihata[1,5], M. Fukuda[6], H. J. Ong[1], N. Aoi[1], Y. Ayyad[1], P.Y. Chan[1], T. H. Hoang[1,2], T. Hashimoto[7], E. Ideguchi[1], A. Inoue[1], T. Kawabata[8], H. K. Le[2], K. Matsuta[6], M. Mihara[6], S. Momota[9], D. Nagae[10],
A. Ozawa[10], P.P. Ren[11], H. Sakaguchi[1], J. Tanaka[1], S. Terashima[5], R. Wada[11], W.P. Liu[11], T. Yamamoto[1]
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] Research Center for Nuclear Physics (RCNP), Osaka University, Japan}\\
{\em [2] Institute of Physic, Hanoi, Vietnam} \\
{\em [3] Faculty of Physics and Engineering Physics, University of Science,VNU-HCM, Vietnam}\\
{\em [4] Pham Ngoc Thach University, Vietnam} \\
{\em [5] Beihang University, China} \\
{\em [6] Department of Physics, Osaka University, Japan} \\
{\em [7] Institute for Basic Science (IBS), Korea} \\

{\em ^{8} Department of Physics, Kyoto University, Japan} \\
{\em ^{9} Kochi University of Technology, Japan} \\
{\em ^{10} IOP University of Tsukuba, Japan} \\
{\em ^{11} Institute of Modern Physics (IMP), China.} \\
\end{center}

% write your abstract here
Nuclear matter radii and charge (proton) distribution radii of unstable nuclei have provided important new information on the structure of nuclei far from stability line, and motivated new research direction of nuclear physics. The proton distribution radii for some of the light and stable nuclei have been determined by isotope shift measurements[1,2,3]. However, this method is not applicable to unstable nuclei from B to Ne isotopes due to the uncertainty in atomic physics calculation. The recent progress of Glauber model analysis enable the extraction of the matter distribution radii and proton distribution radii from cross section. Most of the matter radii for p- and p-sd shell nuclei have been determined by interaction- and/or reaction-cross section measurement and Glauber model[4,5]. Using transmission method, we have measured the charge-changing cross section (CCCS) for neutron-rich carbon isotopes using radioisotope beam at $50A\ MeV$ at RCNP, Osaka University, to determine the proton distribution radii. In this talk, the experiment setup and data analysis: process and results are presented and discussed.

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[1] L. -B Wang \emph{et al.}, Phys. Rev. Lett. {\bf 93}, 142501 (2004)

[2] R. Sanchez \emph{et al.}, Phys. Rev. Lett. {\bf 96}, 033002 (2006)

[3] P. Mueller, Phys. Rev. Lett. {\bf 99}, 252501 (2007)

[4] I. Tanihata \emph{et al.}. Phys. Rev. Lett. {\bf 55}, 2676 (1985)

[5] M. Takechi \emph{et al.}. Phys. Rev. {\bf C79}, 061601 (2009)

\end{document}

Primary author: Mr TRAN, Dinh Trong (Research Center for Nuclear Physics, Osaka, Japan)

Presenter: Mr TRAN, Dinh Trong (Research Center for Nuclear Physics, Osaka, Japan)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **66** Type: **Oral presentation**

Nucleus-nucleus potential with shell-correction contribution: barriers and subbarrier fusion

Thursday, June 25, 2015 6:10 PM (20 minutes)

Primary author: Dr DENISOV, Vitali (Institute for Nuclear Research, Dubna, Russia)

Presenter: Dr DENISOV, Vitali (Institute for Nuclear Research, Dubna, Russia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **68** Type: **Poster**

Projected spectroscopic factor for a pair of like-nucleons transfer reaction within the framework of the Richardson model

Primary author: Mr BENBOUZID, Yazid (Laboratoire de Physique Théorique, Faculté de Physique, USTHB)

Co-authors: Prof. FELLAH, Mohammed (Laboratoire de Physique Théorique, Faculté de Physique, USTHB); Prof. ALLAL, Nassima (Laboratoire de Physique Théorique, Faculté de Physique, USTHB)

Presenter: Prof. ALLAL, Nassima (Laboratoire de Physique Théorique, Faculté de Physique, USTHB)

Track Classification: Nuclear Structure

Contribution ID: **69** Type: **Poster**

Particle-number projection effect, in the isovector pairing case, on the energy of odd mass N close to Z nuclei

Primary author: Prof. FELLAH, Mohammed (Laboratoire de Physique Théorique, Faculté de Physique, USTHB, Alger, ALGERIA)

Co-authors: Prof. OUDIH, Mohamed Reda (Laboratoire de Physique Théorique, Faculté de Physique, USTHB, Alger, ALGERIA); Prof. ALLAL, Nassima (Laboratoire de Physique Théorique, Faculté de Physique, USTHB, Alger, ALGERIA)

Presenter: Prof. FELLAH, Mohammed (Laboratoire de Physique Théorique, Faculté de Physique, USTHB, Alger, ALGERIA)

Track Classification: Nuclear Structure

Contribution ID: **70** Type: **Oral presentation**

Excited sidebands calculated with Hatree-Fock method with PNC pairing

Tuesday, June 23, 2015 3:55 PM (20 minutes)

Primary author: Mr LIANG, Wuyang (Peking University, China)

Co-author: Prof. XU, Furong (Peking University)

Presenter: Mr LIANG, Wuyang (Peking University, China)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **72** Type: **Invited talk - Plenary Session**

A New Generation of Gamma Ray Sources based on Compton back-scattering: future potentialities for Nuclear Physics and Photonics

Wednesday, June 24, 2015 10:00 AM (30 minutes)

Presenter: SERAFINI, Luca (INFN - Milano, Italy)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **74** Type: **Oral presentation**

Impact of pairing effects on thermodynamical properties and clusterization of stellar matter

Tuesday, June 23, 2015 5:45 PM (20 minutes)

Primary author: BURRELLO, Stefano (INFN-LNS, Catania, Italy)

Co-authors: Dr RADUTA, Adriana (IFIN - HH); Prof. GULMINELLI, Francesca (CNRS - ENSICAEN); MATERA, Francesco (FI); Mr AYMARD, Francois (CNRS - ENSICAEN); COLONNA, Maria (LNS)

Presenter: BURRELLO, Stefano (INFN-LNS, Catania, Italy)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **75** Type: **Oral presentation**

Breakup of 22C in a three-body model

Thursday, June 25, 2015 4:15 PM (20 minutes)

Primary author: Dr PINILLA, E. C. (Departamento de Fisica , Universidad Nacional de Colombia, Bogota, Colombia)

Co-author: Prof. DESCOUVEMONT, P. (Physique Nucleaire Theorique et Physique Mathematique, C.P. 229, Universite Libre de Bruxelles (ULB), B 1050 Brussels, Belgium)

Presenter: Dr PINILLA, E. C. (Departamento de Fisica , Universidad Nacional de Colombia, Bogota, Colombia)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **76** Type: **Poster**

Understanding the effect of channel coupling on fusion of 6Li+64Ni

Primary author: Mr SHAIKH, MD. MOIN (Saha Institute of Nuclear Physics, India)

Co-author: Prof. ROY, Subinit (Saha Institute of Nuclear Physics)

Presenter: Mr SHAIKH, MD. MOIN (Saha Institute of Nuclear Physics, India)

Track Classification: Fusion and Fission

Contribution ID: **77** Type: **Oral presentation**

Alpha-particle clustering in excited expanding self-conjugate nuclei

Monday, June 22, 2015 4:05 PM (20 minutes)

Primary author: Dr BORDERIE, Bernard (Institut de Physique Nucléaire, France)

Presenter: Dr BORDERIE, Bernard (Institut de Physique Nucléaire, France)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **78** Type: **Oral presentation**

Measurement of fusion excitation function for 7Li+64Ni at near the VB

Thursday, June 25, 2015 4:00 PM (20 minutes)

Primary author: Mr SHAIKH, MD. MOIN (Saha Institute of Nuclear Physics, Kolkata, India)

Co-authors: Dr MUKHERJEE, A. (Saha Institute of Nuclear Physics); Dr SHRIVASTAVA, A. (Bhabha Atomic Research Centre); Dr PRADHAN, M. K. (Saha Institute of Nuclear Physics); Dr BASU, P. (Saha Institute of Nuclear Physics); Dr PILLAY, R.G. (Tata Institute of Fundamental Research); Dr PAL, S. (Tata Institute of Fundamental Research); Mr RAJBANSHI, S. (Saha Institute of Nuclear Physics); Mr SAHA, S. (Tata Institute of Fundamental Research); Prof. ROY, Subinit (Saha Institute of Nuclear Physics); Dr NANAL, V. (Tata Institute of Fundamental Research)

Presenter: Mr SHAIKH, MD. MOIN (Saha Institute of Nuclear Physics, Kolkata, India)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **79** Type: **Oral presentation**

Elastic nucleon-deuteron scattering and breakup with standard and chiral forces

Monday, June 22, 2015 4:25 PM (20 minutes)

Primary author: Prof. WITALA, Henryk (Jagiellonian University, Poland)

Co-authors: Prof. GOLAK, Jacek (Jagiellonian University); Dr TOPOLNICKI, Kacper (Jagiellonian University); Dr SKIBINSKI, Roman (Jagiellonian University)

Presenter: Prof. WITALA, Henryk (Jagiellonian University, Poland)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **80** Type: **Oral presentation**

Exploration of Nuclear Structure and Decay Properties of Heaviest Elements at SHIP - GSI

Monday, June 22, 2015 5:15 PM (20 minutes)

Primary author: Dr HESSBERGER, Fritz Peter (GSI, Darmstadt, Germany)

Presenter: Dr HESSBERGER, Fritz Peter (GSI, Darmstadt, Germany)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **81** Type: **Poster**

Influence of constant and density-dependent reduced cross-section on transverse flow at intermediate energies

Primary author: Ms KAUR, Mandeep (Department of Physics, Panjab University, Chandigarh, India.)

Co-author: Ms GAUTAM, Sakshi (Department of Physics, Panjab University, Chandigarh, India.)

Presenter: Ms KAUR, Mandeep (Department of Physics, Panjab University, Chandigarh, India.)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **82** Type: **Oral presentation**

Three-body model study of unbound nucleus ^{26}O

Monday, June 22, 2015 5:05 PM (20 minutes)

Primary author: Prof. SAGAWA, Hiroyuki (RIKEN/University of Aizu, Saitama, Japan)

Presenter: Prof. SAGAWA, Hiroyuki (RIKEN/University of Aizu, Saitama, Japan)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **83** Type: **Oral presentation**

Spatial properties of pairing and quarteting correlations in nuclei

Primary authors: Dr DELION, Doru Sabin ("Horia Hulubei" National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania); Mr BARAN, Virgil V. ("Horia Hulubei" National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania)

Presenter: Mr BARAN, Virgil V. ("Horia Hulubei" National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania)

Track Classification: Nuclear Structure

Contribution ID: **84** Type: **Oral presentation**

LIGHT FRAGMENTS FROM (C + Be) INTERACTIONS AT 0.6 GeV/nucleon

Thursday, June 25, 2015 4:00 PM (20 minutes)

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The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy

LIGHT FRAGMENTS FROM (C + Be) INTERACTIONS
AT 0.6 GeV/nucleon

B.M. Abramov, P.N. Alexeev, Yu.A. Borodin, S.A. Bulychjov, I.A. Dukhovskoy, A.P. Krutenkova, V.V. Kulikov, M.A. Martemianov, M.A. Matsyuk, E.N. Turdakina, A.I. Khanov
Institute for Theoretical and Experimental Physics SRC KI, 117218 Moscow, Russia

S.G.Mashnik
Los Alamos National Laboratory, Los Alamos, NM, USA

Momentum distributions of hydrogen and helium isotopes from 12C fragmentation on a Be target were measured at 3.5o in the FRAGM experiment [1] at the ITEP TWA heavy ion accelerator. The fragments were selected by correlated time of flight and dE/dx measurements with a magnetic spectrometer with scintillation counters. The main attention was drawn to the high momentum region where the fragment velocity exceeds the velocity of the projectile nucleus. At energy 0.6 GeV/nucleon the momentum spectra of fragments span the region of the fragmentation peak as well as the cumulative region. The differential cross sections cover three-six orders of magnitude depending on the fragment. The shapes of the momentum spectra are compared to the predictions of four ion-ion interaction models: INCL++, LAQGSM03.03, QMD and BC. The kinetic energy spectra of the fragments in the projectile rest frame are fitted with the sum of two exponents with different slope parameters. The temperatures of the source extracted from the slope parameters are 5-8 MeV for a soft component and 15-30 MeV for a hard component. For each fragment the temperatures are compared with the predictions of the above mentioned models as well as with those measured at 1 GeV/nucleon in Au+Au interactions [2]. A dependance of these temperatures on the fragment type is discussed.
[1] B.M.Abramov et al. JETP Lett. 97,439 (2013); Kulikov et al. POS(Baldin ISHEPP XXII) 079 (2015)
[2] T. Odeh et al. Phys. Rev. Lett. 84, 4557 (2000).

Primary author: Dr KRUTENKOVA, Anna (ITEP, Moscow, Russia)

Presenters: Dr KRUTENKOVA, Anna (ITEP, Moscow, Russia); Dr ZARUBIN, Pavel (Joint Institute for Nuclear Research, Dubna, Russia)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **85** Type: **Invited Talk - Parallel Session**

The role of the symmetry energy on Pygmy Dipole Resonance dynamics: from schematic models to transport approaches

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By considering different parameterizations with density of the symmetry energy is investigated theoretically the emergence and the nature of the low energy dipole response evidenced experimentally for various systems. We analyze the consistency of the predictions provided
by a generalization of the Brown-Bolsterli schematic model with a density dependent particle-hole residual interaction and those
based on self-consistent microscopic transport approaches using the Vlasov equation. In both cases an additional collective mode is signaled whose energy centroid is closer to the distance between two major shells and exhaust few percentages of Energy Weighted Sum Rule.
From the sensitivity of EWSR to the density dependence of the symmetry energy is concluded that precise experimental determination of the
PDR properties can settle important constraints
on the behavior of the symmetry energy well below saturation.

Primary author: Prof. BARAN, Virgil (University of Bucharest, Romania)

Co-authors: Mrs CROITORU, Andreea (University of Bucharest, Romania); Mr PALADE, Dragos Iustin (University of Bucharest, Romania); Prof. COLONNA, Maria (Laboratori Nazionali del Sud, Catania, Italy); Prof. DI TORO, Massimo (University of Catania, Italy)

Presenter: Prof. BARAN, Virgil (University of Bucharest, Romania)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **88** Type: **Oral presentation**

Evaluation of inelastic breakup in reactions induced by weakly-bound nuclei within a three-body model

Tuesday, June 23, 2015 4:00 PM (20 minutes)

Primary authors: Mr JIN, Lei (Universidad de Sevilla, Spain); Mr ANTONIO, Moro (Universidad de Sevilla, Spain)

Presenter: Mr JIN, Lei (Universidad de Sevilla, Spain)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **90** Type: **Oral presentation**

Asymptotic Normalisation Coefficients from the 26Al(d,p)27Al reaction, mirror nuclei study and application to nuclear astrophysics

Tuesday, June 23, 2015 5:50 PM (20 minutes)

Primary author: Mr MARGERIN, Vincent (University of Edinburgh, United Kingdom)

Co-authors: Dr ROJAS, Alexander (TRIUMF); Dr DAVIDS, Barry (TRIUMF); Dr RUIZ, Chris (TRIUMF); Dr DOHERTY, Daniel (CEA); Dr LOTAY, Gavin (University of Surrey); Dr CHRISTIAN, Greg (TRIUMF); Prof. TOSTEVIN, Jeff (University of Surrey); Dr FALLIS, Jennifer (TRIUMF); Dr ALIOTTA, Marialuisa (University of Edinburgh); Dr TIMOFEYUK, Natasha (University of Surrey); Dr KIRSEBOM, Oliver (TRIUMF); Prof. WOODS, Philip (University of Edinburgh); Dr DAVINSON, Thomas (University of Edinburgh)

Presenter: Mr MARGERIN, Vincent (University of Edinburgh, United Kingdom)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **92** Type: **Oral presentation**

16O + 16O molecular structures of positive- and negative-parity superdeformed bands in 34S

Tuesday, June 23, 2015 6:30 PM (20 minutes)

Primary author: Dr TANIGUCHI, Yasutaka (Nihon Institute of Medical Science, Japan)

Presenter: Dr TANIGUCHI, Yasutaka (Nihon Institute of Medical Science, Japan)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **93** Type: **Poster**

Intermediate energy heavy-ion collisions in asymmetric colliding nuclei: multifragmentation as an example

Primary author: Mr ARUN, Arun Sharma (University of Jammu, Jammu, India)

Co-authors: Prof. ARUN, Arun Bharti (University of Jammu, Jammu, India); Dr SAKSHI, Sakshi Gautam (Panjab University, Chandigarh, India)

Presenter: Mr ARUN, Arun Sharma (University of Jammu, Jammu, India)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **94** Type: **Oral presentation**

Analysis of angular distribution of fragments in relativistic heavy-ion collisions by quantum molecular dynamics

Tuesday, June 23, 2015 6:10 PM (20 minutes)

Primary author: Dr OGAWA, Tatsuhiko (Japan Atomic Energy Agency, Ibaraki Tokai, Japan)

Co-authors: Dr NIITA, Koji (Research Organization for Information Science and Technology); Dr HASHIMOTO, Shintaro (Japan Atomic Energy Agency); Dr SATO, Tatsuhiko (Japan Atomic Energy Agency)

Presenter: Dr OGAWA, Tatsuhiko (Japan Atomic Energy Agency, Ibaraki Tokai, Japan)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **95** Type: **Oral presentation**

Detector developments for the Super-FRS

Thursday, June 25, 2015 6:15 PM (20 minutes)

Primary author: Dr NOCIFORO, Chiara (GSI, Darmstadt, Germany)

Presenter: Dr NOCIFORO, Chiara (GSI, Darmstadt, Germany)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **96** Type: **Oral presentation**

Influence of various potentials on fragment production in asymmetric collisions

Thursday, June 25, 2015 6:35 PM (20 minutes)

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The knowledge of nuclear interaction potential is a fundamental theoretical tool in the analysis of heavy ion collisions. It is a key ingredient for constructing the nuclear equation of state (NEOS) [1]. The general trend of using the nucleon-nucleon (n-n) interaction potential is to parameterize this potential as a function of density. While parametrizing the potential, one starts with the basic fundamental interaction i.e. Skyrme interaction and then add other components of potential such as Yukawa, Coulomb, momentum dependent interaction and symmetry potential in the study of symmetric as well as asymmetric collisions [2].

In our study, the relative contribution of various components of n-n interaction potential has been investigated by studying the production of various fragments within different rapidity domains for the various asymmetric reactions at b = 0 fm and Ebeam between 50 and 150 MeV/A by using the isospin-dependent quantum molecular dynamics model [3]. It has been observed that different components of n-n potential play a significant role towards the fragment production in participant region as well as quasi participant rapidity region. The three components namely, Skyrme, Yukawa and Coulomb are sufficient to describe the fragmentation for the central collisions. However, at peripheral colliding geometries, momentum dependent interactions are needed to explain the fragmentation. The competition between different component of potentials show large impact on the production of fragments.
References:
[1] J. Aichelin, A. Rosenhauer, G. Peilert, H. Stocker and W. Greiner, Phys. Rev. Lett. 58, 1926 (1987).
[2] V. Kaur, M. Kaur and S. Kumar, Nuclear Data Sheets118, 33 (2014); V. Kaur and S. Kumar, J. Phys. G: Nucl. Part. Phys.39, 085114 (2012).
[3] C. Hartnack, R. K. Puri, J. Aichelin, J. Konopka, S. A. Bass, H. Stocker, and W. Greiner, Eur. Phys. J. A 1, 151 (1998).

Primary author: Ms KAUR, Manpreet (Mata Gujri College)

Co-author: Dr KAUR, Varinderjit (Mata Gujri College, Patiala, India)

Presenter: Dr KAUR, Varinderjit (Mata Gujri College, Patiala, India)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **97** Type: **Oral presentation**

Does monopole pigmy resonance exist in ^{68}Ni ?

Monday, June 22, 2015 3:40 PM (20 minutes)

Primary author: Prof. SAGAWA, Hiroyuki (RIKEN/University of Aizu, Japan)

Presenter: Prof. SAGAWA, Hiroyuki (RIKEN/University of Aizu, Japan)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **98** Type: **Poster**

Role of asymmetry effects in projectile fragmentation using momentum dependent interactions.

Primary author: Dr KAUR, Varinderjit (Mata Gujri College, Patiala, India)

Presenter: Dr KAUR, Varinderjit (Mata Gujri College, Patiala, India)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **99** Type: **Poster**

Coupling of alpha- and t-cluster structures in excited deformed states of 35Cl

Primary author: Dr TANIGUCHI, Yasutaka (Nihon Institute of Medical Science, Japan)

Presenter: Dr TANIGUCHI, Yasutaka (Nihon Institute of Medical Science, Japan)

Track Classification: Nuclear Structure

Contribution ID: **100** Type: **Oral presentation**

Electron screening in laboratory experiments-an unresolved effect

Tuesday, June 23, 2015 6:50 PM (20 minutes)

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Energy production, evolution and neutrino emission in stars are governed by fusion reactions. The influence of surrounding electrons that inevitably surround interacting nuclei is very poorly understood in still experimentally unachievable stellar plasmas. Therefore, it is of significant importance to measure the bare cross sections as well as possible. The probability for tunnelling through the Coulomb barrier depends on its height exponentially and even small changes to the barrier caused by electrons surrounding the reactants in laboratory experiments have a significant effect on the fusion cross section. As a result, the measured cross sections are enhanced compared to cross sections for bare nuclei. Experimental studies of various nuclear reactions in metallic environments have shown the expected cross section enhancement at low energies [1-4]. However, the enhancements in metallic targets were significantly larger than expected from the adiabatic limit, which is thought to provide the theoretical maximum for the magnitude of electron screening. The electron screening is an effect far from being understood in the laboratory conditions and consequently it cannot be deduced theoretically. Moreover, its size has to be measured for each metallic environment and each target separately.
Recently, we performed an extensive experimental campaign, with an aim to study the electron screening in the laboratory for various nuclear reactions and involving both low and high Z targets. The 1H(7Li,α)4He fusion reaction was studied for hydrogen implanted Pd, Pt, Zn and Ni targets. Large electron screening, of a few keV was observed in all targets. On the contrary, no large electron screening was observed in the following proton induced reactions: 55Mn(p,γ)56Fe, 55Mn(p,n)55Fe, 113Cd(p,n)113In, 115In(p,n)115Sn, 50V(p,n)50Cr and 51V(p,γ)52Cr. Moreover, no shift in resonance energy for metallic compared to insulator environment was observed for the studied (p,n) and (p,γ) reactions. In a continuation of our experimental campaign, we further investigated the 1H(7Li,α)4He reaction in W, Pd and C environments. In addition, we also focused on studies of electron screening in the 1H(19F,αγ)16O reaction in the same targets (in both normal and inverse kinematics). Preliminary results showed unexpectedly large electron screening values (of the order of 10 keV), pointing to a dependence of the electron screening potential on the position of the target nuclei in metallic lattice as well as to a non-linear scaling (instead of widely accepted linear one) of electron screening potential with the charge number of the target. These hypotheses, if correct, would have a profound effect on the understanding of the “laboratory” electron screening effect and would eventually lead to the more correct bare cross sections extracted from laboratory measurements. Untill plasma experiments become feasible in the laboratory, the study of electron screening in a metal - the plasma of a poor man [2], is the only means of study that will hopefully successfully point towards the correct interpretation of the electron screening and further understanding of immensely important fusion processes in stellar environments. A review of previous results, as well as newly obtained ones will be presented.

[1] J. Cruz et al., Phys. Lett. B624, 181 (2005).
[2] C. Rolfs, AIP Conf. Proc. 847, 245 (2006).
[3] F. Raiola et al., Eur. Phys. J. A 19, 283 (2004).
[4] K. U. Kettner et al., J. Phys. G 32, 489 (2006).

Primary author: Dr VESIC, Jelena (Jozef Stefan Institute, Ljubljana, Slovenia)

Co-authors: Ms CVETINOVIC, Aleksandra (Jozef Stefan Institute, Ljubljana, Slovenia); Prof. LIKAR, Andrej (Jozef Stefan Institute, Ljubljana, Slovenia); Dr LIPOGLAVSEK, Matej (Jozef Stefan Institute, Ljubljana, Slovenia)

Presenter: Dr VESIC, Jelena (Jozef Stefan Institute, Ljubljana, Slovenia)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **101** Type: **Oral presentation**

Search for 4He-η bound states in dd → 3Hepπ – and dd → 3Henπ 0 reactions with the WASA-at-COSY facility

Monday, June 22, 2015 5:05 PM (20 minutes)

Primary author: Ms SKURZOK, Magdalena (Jagiellonian University, Krakow, Poland)

Co-authors: Prof. MOSKAL, Pawel (Jagiellonian University); Dr KRZEMIEN, Wojciech (Jagiellonian University)

Presenter: Ms SKURZOK, Magdalena (Jagiellonian University, Krakow, Poland)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **102** Type: **Poster**

Configuration-Space Monte-Carlo Approach to Problem of Pairing in Nuclei

Primary author: Prof. VOLYA, Alexander (Florida State University)

Presenter: Prof. VOLYA, Alexander (Florida State University)

Track Classification: Nuclear Structure

Contribution ID: **104** Type: **Poster**

Thermal binding energies in clusterization algorithm and its effect on fragmentation

Primary author: Mr KUMAR, Rohit (Research Scholor)

Co-author: Dr GAUTAM, Sakshi (Panjab University Chandigarh INDIA)

Presenter: Dr GAUTAM, Sakshi (Panjab University Chandigarh INDIA)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **105** Type: **Oral presentation**

Coulomb breakup of 37Mg and its ground state structure

Thursday, June 25, 2015 5:50 PM (20 minutes)

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Coulomb breakup of nuclei away from the valley of stability have been one of the most successful probes to unravel their structure. However, it is only recently that one is venturing into medium mass nuclei like ^{23}O [1] and ^{31}Ne[2], especially in and around the so called “island of inversion”. This is a very new and exciting development which has expanded the field of light exotic nuclei to the deformed medium mass region.

In this contribution we report new results [3] on the Coulomb breakup of neutron rich ^{37}Mg nucleus on a Pb target at the beam energy of 244 MeV/nucleon within the framework of a finite range distorted wave Born approximation theory that is extended to include the projectile deformation effects. In this theory, the breakup amplitude involves the full wave function of the projectile ground state. Calculations have been carried out for the total one-neutron removal cross section (σ_{-1n}), the neutron-core relative energy spectrum, the parallel momentum distribution of the core fragment, the valence neutron angular, and energy-angular distributions.

The calculated σ_{-1n} has been compared with the recently measured data to put constraints on the spin parity, and the one-neutron separation energy (S_{-1n}) of the ^{37}Mg ground state (^{37}Mg$_{gs}$). The dependence of σ_{-1n} on the deformation of this state has also been investigated. Our study suggests that ^{37}Mg$_{gs}$ is most likely to have a spin parity assignment of $3/2^-$. Using the shell model value for the spectroscopic factor for this configuration and without considering the projectile deformation effects, a S_{-1n} of 0.10 ± 0.02 MeV is extracted. Inclusion of the deformation effects increases the value of the deduced S_{-1n}. The narrow parallel momentum distribution of the core fragment and the strong forward peaking of the valence neutron angular distribution suggest a one-neutron halo configuration in the $2p_{3/2}$ ground state of ^{37}Mg.

We shall also show how our calculated neutron-core relative energy spectrum
in the breakup of ^{37}Mg on a Pb target could be used to extract the
^{36}Mg$(n,\gamma)^{37}$Mg radiative capture cross section. To the best
of our knowledge this would be the first
application of a fully quantum mechanical theory of Coulomb breakup \textit{with
deformed projectiles} as an indirect method in nuclear astrophysics. The ^{36}Mg$(n,\gamma)^{37}$Mg reaction
is thought to compete with the
^{36}Mg$(\alpha,n)^{39}$Si reaction and could affect a new \textit{r}-process
path proposed in Ref. [4], initiated from light elements.

Our study is thus expected to provide motivation for future experiments on breakup reactions of the neutron rich medium mass nuclei, given that we have identified the observables that are more critically dependent on the ground state structure of the projectile.

[1] R. Chatterjee, R. Shyam, K. Tsushima, A. W. Thomas, Nucl. Phys.{\bf A913}, 116 (2013)\\

[2] Shubhchintak and R. Chatterjee, Nucl. Phys.{\bf A922}, 99 (2014)\\

[3] Shubhchintak, Neelam, R. Chatterjee, R. Shyam, arXiv/nucl-th:1501.03642\\

[4] M. Terasawa \emph{et al.}, Astrophys. J. {\bf 562}, 470 (2001)

Primary author: Dr CHATTERJEE, Rajdeep (Dept. of Physics, IIT-Roorkee, India)

Co-authors: Prof. SHYAM, Radhey (Saha Institute of Nuclear Physics, Kolkata, India); Dr SHARMA, Shubhchintak (Dept. of Physics, IIT-Roorkee, India)

Presenter: Dr CHATTERJEE, Rajdeep (Dept. of Physics, IIT-Roorkee, India)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **106** Type: **Poster**

The observation of Element 117: Opportunity for next generation experiments with the new ALBEGA multi-coincidence detection setup

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{\large \bf The observation of Element 117: Opportunity for next generation experiments with the new ALBEGA multi-coincidence detection setup}
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\underline{A. Di Nitto}
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\underline{Mainz University, 55099 Mainz, Germany }
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{\em for a HIM, Germany; GSI, Germany; Mainz U., Germany; LBNL+UC Berkeley, USA; ORNL+UT Knoxville USA; JAEA, Japan; Liverpool U., UK; ANU, Australia; Lund U., Sweden; LLNL, USA; Vanderbilt U., USA; SINP, India; Oslo U., Norway; Bern U.+PSI, Switzerland;
Jyv\"askyl\"a U., Finland; ITE Warsaw, Poland; IITR, India collaboration

(the TASCA and ALBEGA Collaborations) }
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The present knowledge of the nuclear structure of superheavy nuclei (SHN) is still scarce, in spite of

large experimental and theoretical efforts devoted to this problem in the last decades.
This is mainly due to the low production rate of these nuclei.
The synthesis of SHN can be achieved preferably by heavy-ion
induced fusion-evaporation reactions and can easily require a day, a week, or several months of beam time for single event observation [1].

Such measurements are typically performed with in-flight recoil separators in combination with a detection
setup.
I will present the results of a recent experiment on the production of the element with
Z=117 [2] as an example of a SHN program conducted at the upgraded gas-filled
recoil separator TASCA (the TransActinide Separator and Chemistry Apparatus).
%The element Z=117 was produced as an evaporation residue in the $^{48}\mathrm{Ca}+^{249}\mathrm{Bk}$ fusion reaction.
Experiments on $^{294}117$ performed at TASCA [2] and DGFRS (the Dubna Gas-Filled Recoil Separator) [3] both report that
many decay products along the decay chain feature half-lives longer than 1 s.
This offers, as a complementary approach, opportunities to chemically isolate these isotopes,
as was done, e.g. in [4].

It has been experimentally shown that physics experiments can benefit from a chemical isolation [5].
In particular, the application of chemical isolation to the ions
selected with a recoil separator
has significantly improved the background conditions, as described in Refs. [4-7].
So far, e.g., the gas-thermochromatography detector setups like COMPACT [5] or COLD [7] were successfully used.
A next generation setup, ALBEGA (for measurements of ALpha-BEta-GAmma decays after chemical isolation) was recently developed at GSI.
ALBEGA is dedicated to collect spectroscopic data by detecting simultaneously
α-particles, electrons, photons, and fission fragments.
I will present the current status of ALBEGA and an outlook on its future applications.

\vspace*{0.5cm}

\textbf{References}

[1] J. H. Hamilton, S. Hofmann and Yu. Ts. Oganessian, Ann. Rev. Nucl. Part. Sci. 63, 383 (2013).

[2] J. Khuyagbaatar et al., Phys. Rev. Lett. 112, 172501 (2014).

[3] Yu. Ts. Oganessian, Phys. Rev. Lett. 104, 142502 (2010).

[4] A. Yakushev et al., Inorg. Chem. 53, 1624-1629 (2014).

[5] J. Dvorak et al., Phys. Rev. Lett. 97, 242501 (2006).

[6] J. Even et al., J. Radioanal. Nucl., in press (2015) doi: 10.1007/s10967-014-3793-7.

[7] D. Wittwer et al., Nucl. Inst. and Meth. B 286, 28-35 (2010).

\end{document}

Primary author: Dr DI NITTO, Antonio (Mainz University)

Presenter: Dr DI NITTO, Antonio (Mainz University)

Track Classification: Heavy and Superheavy Elements

Contribution ID: **107** Type: **Poster**

Projected total energy surface description for axial shape asymmetry in even-even nuclei

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The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy

Projected total energy surface description for axial shape
asymmetry in even-even nuclei

Tuya1, Yong-shou Chen2

1 College of Physics Science and Technology, ShenYang Normal University, Shenyang 110034, China;
2 China Institute of Atomic Energy, Beijing 102413, China

The projected total energy surface (PTES) approach has been developed based on the triaxial projected shell model (TPSM) hybridized with the macroscopic–microscopic method. The total energy of an atomic nucleus is decomposed into macroscopic, microscopic and rotational terms. The macroscopic and microscopic components are described with the liquid drop model and Strutinsky method, respectively, and the rotational energy is given by the TPSM, the term beyond the mean field. To test theory, the PTES calculations have been carried out for the yrast states of the well deformed rare earth nuclei W, and the theoretical results are in good agreement with the experimental data. By using the equilibrium quardrupole deformations determined by the PTES, the calculation of the transition quardrupole moment (Qt) in function of spin also reproduces the experimental data. A comparison between the PTES and TRS methods has been made for theoretical and application uses.

Primary author: Prof. YA, Tu (College of Physics science and Technology, ShenYang Normal University,ShenYang,China)

Co-author: Prof. YONG-SHOU, Chen (China Institute of Atomic Energy, P.O. Box 275(18), Beijing 102413, Chin)

Presenter: Prof. YA, Tu (College of Physics science and Technology, ShenYang Normal University,ShenYang,China)

Track Classification: Nuclear Structure

Contribution ID: **108** Type: **Poster**

Properties of quark matter and structure of compact stars in the perturbation model with a rapidly convergent matching-invariant running coupling

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The properties of dense quark matter are investigated in the perturbation theory with a rapidly convergent matching-invariant running coupling constant. The fast convergent speed is mainly due to the resummation of an infinite number of known logarithmic terms in a compact form. The only parameter in this model, the ratio of the renormalization subtraction point to the chemical potential, is restricted to be about 2.64 according to the Witten-Bodmer conjecture, which gives the maximum mass and the biggest radius of quark stars to be, respectively, two times the solar mass and 11.7 kilometers.

Primary author: Prof. PENG, Guangxiong (University of Chinese Academy of Sciences)

Presenter: Prof. PENG, Guangxiong (University of Chinese Academy of Sciences)

Track Classification: Nuclear Astrophysics

Contribution ID: **109** Type: **Oral presentation**

alpha Cluster Structure in Unbound States of 19Ne

Thursday, June 25, 2015 3:15 PM (20 minutes)

Primary author: Mr OTANI, Reiji (Kansai University, Osaka, Japan)

Co-authors: Dr ITO, Makoto (Department of Pure and Applied Physics, Kansai University); Mr IWASAKI, Masataka (Kansai University)

Presenter: Mr OTANI, Reiji (Kansai University, Osaka, Japan)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **110** Type: **Oral presentation**

Coupled Rearrangement Channels Calculation of The Three Body System under The Absorbing Boundary Condition

Thursday, June 25, 2015 6:30 PM (20 minutes)

Primary author: Mr IWASAKI, Masataka (Department of Pure and Applied Physics, Kansai University, Japan)

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Presenter: Mr IWASAKI, Masataka (Department of Pure and Applied Physics, Kansai University, Japan)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **111** Type: **Oral presentation**

Microscopic nuclear form factors for the pygmy dipole resonance

Tuesday, June 23, 2015 5:50 PM (20 minutes)

Primary author: LANZA, Giuseppe Edoardo (INFN-Sezione di Catania, Italy)

Co-authors: VITTURI, Andrea (PD); ANDRÉS, Maria Victoria (Universidad de Sevilla)

Presenter: LANZA, Giuseppe Edoardo (INFN-Sezione di Catania, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **112** Type: **Oral presentation**

Unified studies of structures and reaction in two-center systems

Tuesday, June 23, 2015 3:40 PM (20 minutes)

Primary author: Dr ITO, Makoto (Kansai University, Osaka, Japan)

Presenter: Dr ITO, Makoto (Kansai University, Osaka, Japan)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **113** Type: **Poster**

Analysis of the reaction size by the method of the scattering radius

Primary author: Dr ITO, Makoto (Department of Pure and Applied Physics, Kansai University)

Co-authors: Mr IWASAKI, Masataka (Kansai University); Mr OTANI, Reiji (Department of Pure and Applied Physics, Kansai University)

Presenter: Dr ITO, Makoto (Department of Pure and Applied Physics, Kansai University)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **114** Type: **Oral presentation**

Isospin influence on the decay modes of systems produced in the 78,86Kr+40,48Ca at 10AMeV

Tuesday, June 23, 2015 3:55 PM (20 minutes)

Primary author: GNOFFO, Brunilde (INFN-Sezione di Catania, Italy)

Presenter: GNOFFO, Brunilde (INFN-Sezione di Catania, Italy)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **115** Type: **Oral presentation**

Excited states of 26Al studied via the reaction 27Al(d , t)

Thursday, June 25, 2015 6:15 PM (20 minutes)

Primary author: Mr SRIVASTAVA, Vishal (Variable Energy Cyclotron Centre, Kolkata, India)

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Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **116** Type: **Oral presentation**

First observation of beta-delayed gamma-proton decay in 56Zn

Tuesday, June 23, 2015 6:10 PM (20 minutes)

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We report the observation of a very exotic decay mode at the proton drip-line, the beta-delayed gamma-proton decay, clearly seen in the beta decay of the Tz = -2 nucleus 56Zn [1]. Here this decay mode, already observed once in the sd-shell [2], is seen for the first time in the fp-shell.

The experiment was performed at the LISE3 facility of GANIL, using a 58Ni26+ primary beam with an average intensity of 3.7 euA, accelerated to 74.5 MeV/nucleon and fragmented on a 200 um thick natural Ni target. The fragments were selected by the LISE3 separator and implanted into a Double-Sided Silicon Strip Detector 300 um thick, surrounded by four EXOGAM Ge clovers for gamma detection.

The proton decay of the 56Zn Isobaric Analogue State is normally expected to be isospin forbidden, however competition between beta-delayed protons and beta-delayed gamma rays has been observed. Similar cases have been seen before. The particularity here is that the states populated in the gamma de-excitation are also proton-unbound, consequently the rare and exotic beta-delayed gamma-proton decay has been observed. In particular, three gamma-proton sequences have been seen after the beta decay [1]. This observation is very important because it does affect the conventional way to determine the Gamow-Teller (GT) transition strength B(GT) near the proton drip-line, where the general opinion until now was that the B(GT) is simply deduced from the intensity of the proton peaks. On the contrary, the observed proton intensities are due to both direct feeding and indirect feeding coming from the gamma de-excitation. Thus both gamma and proton decays have been taken into account in the estimation of the Fermi and GT strengths. Evidence for fragmentation of the Fermi strength due to strong isospin mixing is found. The results are compared with the mirror process, the 56Fe(3He,t)56Co reaction [3].

The beta-delayed gamma-proton decay may become a common decay mode in heavier, more exotic systems with Tz ≤ −3/2, which will be studied this year at the Radioactive Ion Beam Factory at RIKEN during the EUroball RIken Cluster Array (EURICA) campaign.

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Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **117** Type: **Oral presentation**

Effects of symmetry energy and momentum dependent interaction on low-energy reaction mechanisms

Thursday, June 25, 2015 4:00 PM (20 minutes)

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The Stochastic Mean Field model including momentum dependent interaction is developed. We also incorporate the standard Skyrme effective interaction into the model, employing several parameterizations available in the literature. Within the framework of this model, we study the effects of momentum dependent interaction on low-energy reaction mechanisms, which are affected by the properties of nuclear matter at sub-saturation regions. In particular, the effect on collective excitation mechanisms, such as dipole mode excitations, will be investigated. The role of the isovector terms of the nuclear interaction, connected
to the symmetry energy of the nuclear EoS, will be discussed. On the other hand, we also investigate the impact of the nuclear symmetry energy on some features of compact stars. We use different EoS to study neutron stars by solving the TOV equations. We demonstrate that different EoS give different mass and radius relation for neutron stars even when they have exactly the same ground state (gs) properties.

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Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **118** Type: **Oral presentation**

New evidence of soft dipole resonance in 11Li

Tuesday, June 23, 2015 3:20 PM (20 minutes)

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Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **119** Type: **Poster**

System size dependence of the energy of peak production of fragments

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Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **120** Type: **Poster**

Effect of deformations and orientations in 100Sn daughter radioactivity

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Presenter: Dr SAWHNEY, Gudveen (Panjab University, Chandigarh)

Track Classification: Nuclear Structure

Contribution ID: **121** Type: **Oral presentation**

Neutron Star Structure from the Quark-Model Baryon-Baryon Interaction

Tuesday, June 23, 2015 6:30 PM (20 minutes)

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Presenter: Dr FUKUKAWA, Kenji (Research Center for Nuclear Physics, Osaka, Japan)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **122** Type: **Poster**

Elastic scattering of 17O ions from 58Ni at near-barrier energies

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A powerful tool for the study of weakly bound nuclei is the elastic scattering process, which provides a first information on the overall reactivity of the collision participants. We measured the elastic scattering angular distributions for the reaction 17O+58Ni in order to compare the reactivity of 17O (Sn= 4.143 MeV) with its mirror nucleus 17F (S_p= 0.600 MeV). The experiment was performed at the Laboratori Nazionali di Legnaro with an 17O beam in the energy range 40.0-50.0 MeV impinging on a 58Ni (150ug/cm2) target with a 208Pb (50ug/cm2) backing. Three Eres DSSSDs modules of the EXPADES [1] array where placed at +-50° (45°<theta<80°) and +110° (111°<theta<140°). Data were analyzed within the frame of the Optical Model using both Woods-Saxon and M3Y double-folding potentials. Fig. 1 shows the elastic scattering angular distributions and the optical model best fits for the two approaches. The resulting fit parameters agree with a model describing the 17O nucleus as a 16O core with a valence neutron orbiting in a d5/2 state [2]. The reduced total reaction cross sections, shown in the inset of Fig. 1, result to be slightly lower than those of 16O+58Ni system [3], but higher than those of 17F+58Ni system [4]. This outcome suggests that, for the pair 17O-17F, nuclear structure effects play a more relevant role than the projectile binding energy in the reaction dynamics at Coulomb barrier energies.

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Presenter: STRANO, Emanuele (PD)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **124** Type: **Oral presentation**

Astrophysical S factors for the reaction 6Li(p,γ)7Be at extremely energies

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Track Classification: Nuclear Astrophysics

Contribution ID: **125** Type: **Oral presentation**

Microscopic description of fission using dynamical theories

Tuesday, June 23, 2015 3:35 PM (20 minutes)

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Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **127** Type: **Oral presentation**

g-factor Measurements for Isomeric States in 174W

Tuesday, June 23, 2015 3:15 PM (20 minutes)

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A lively topic of the nuclear physic investigation concerns the study of high-K isomeric states. These states are useful to understand the nuclear structure and can provide crucial information for testing the theoretical models. Furthermore, the knowledge of the properties of these long-living states may be useful for practical applications in medicine and energy storage methods.

The K quantum number is defined as the projection of the total angular momentum on the symmetry axis of symmetrically deformed nuclei, and the decay among states characterized by different values of K is governed by selection rules. Even if K isomers have been observed in many nuclei, mostly in the A ~ 180 region of the nuclide chart corresponding to well deformed nuclei (like Hf, W and Os isotopes), their decay mechanism is not yet well understood. One hypothesis is the mechanism of K-mixing, in which the mixing of configurations with different K gives the reduced hindrance factor of these states [1]. Another mechanism is the gamma-tunneling, in which non-axial fluctuations of the nuclear shape are responsible for the tunneling of the nucleus between configurations with different values of the triaxiality parameter gamma. This latter mechanism has proved to well describe the behaviour of K isomers in the A ~ 180 region [2].

In this contribution we report on a recent study of the isomeric states of 174W through the measurement of their giromagnetic factors. This nucleus is of particular interest since the 12+ isomer shows a decay branch going directly to the ground state band, thus implying a change of 12 units of K. The gamma-tunneling mechanism fail to account for the properties of this particular state [3]. In order to analyse this state in term of K-mixing, the knowledge of its multi-quasiparticle configuration is necessary. The nuclear observable connected to the configuration of multi-quasiparticle of the level is the magnetic dipole moment, which can be determined through giromagnetic factor measurements.

The experiment was performed at Legnaro National Laboratory, exploiting the well known TDPAD technique, using the existence GAMIPE apparatus which will be described in detail. The isomeric states were populated using the reaction 162Dy(16O,4n)174W at beam energy of 84MeV.

The measured value of g-factor has been compared with theoretical estimates for achieved the multi-quasiparticles configuration of the level 12+. This result will be the starting point for the explanation of the decay mechanism of this level through the K-mixing model.

[1] P.M. Walker et al., Phys. Rev. C 81, 041304(R) (2010)
[2] K. Narimatsu et al., Nucl. Phys. A 601, 69 (1996)
[3] S.K. Tandel et al., Phys. Rev. C 73, 044306 (2006)

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Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **128** Type: **Invited Talk - Parallel Session**

The ASY-EOS experiment at GSI: investigating symmetry energy at supra-saturation densities

Tuesday, June 23, 2015 5:00 PM (25 minutes)

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{\large \bf The ASY-EOS experiment at GSI: investigating symmetry energy at supra-saturation densities }
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
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The elliptic-flow ratio of neutrons with respect to protons or light complex particles in reactions of heavy-ions at pre-relativistic energies is proposed as an observable sensitive to the strength of the symmetry term in the nuclear equation of state at supra-saturation densities. The results obtained from the existing FOPI/LAND data for $^{197}Au+^{197}Au$ collisions at 400 MeV/nucleon in comparison with the UrQMD model favour a moderately soft symmetry term but suffer from a considerable statistical uncertainty [1]. These results have been confirmed by an independent analysis based on T\"{u}bingen QMD [2]. In order to obtain an improved data set for Au+Au collisions and to extend the study to other systems, a new experiment was carried out at the GSI laboratory by the ASY-EOS collaboration [3]. The flows of neutrons and light charged particles were measured for $^{197}Au+^{197}Au$, $^{96}Ru+^{96}Ru$, and $^{96}Zr+^{96}Zr$ collisions at 400 MeV/nucleon using the Large Area Neutron detector LAND, four double-rings of the forward part of the CHIMERA multi-detector, the ALADIN ToF-Wall, the KRATTA Si-CsI triple-telescope array and the Microball detectors. First

results, including comparison of elliptic flow ratios with UrQMD calculations for Au+Au system, will be reported.

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%[1] A. AAAA \emph{et al.}, Phys. Rev. Lett. {\bf 1}, 1 (2015)
[1] P. Russotto \emph{et al.}, Phys. Lett. {\bf B 697} (2011) 471.

[2] M.D. Cozma, Phys. Lett. {\bf B 700}, 139 (2011); M.D. Cozma \emph{et al.}, Phys. Rev. {\bf C} 88, 044912 (2013).

[3] P. Russotto \emph{et al.}, Eur. Phy. J {\bf A 50}, 38 (2014).

\end{document}

Primary author: RUSSOTTO, Paolo (INFN-Sezione di Catania, Italy)

Presenter: RUSSOTTO, Paolo (INFN-Sezione di Catania, Italy)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **129** Type: **Oral presentation**

Measurements of secondary particle production induced by particle therapy ion beams impinging on a PMMA phantom

Tuesday, June 23, 2015 3:45 PM (20 minutes)

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Particle therapy is a technique that uses accelerated charged ions for cancer treatment. The high irradiation precision and conformity achievable with heavy ions enhance the Radio Biological Effectiveness (RBE) of such therapy while helping sparing the surrounding healthy tissues and Organs At Risk (OAR). To fully profit from the improved therapy spatial selectiveness, a novel monitoring technique, capable of providing a high precision “in-treatment” feedback on the dose release position, is required. Since the primary beam is fully stopped inside the patient body, it is necessary to exploit the knowledge on the secondary fragments, that are capable of exiting the body, in order to reconstruct “online” the dose release spot.

In this contribution we will review the results from a campaign of measurements at different beam facilities (LNS - Catania, GSI - Darmstadt, HIT - Heidelberg), aiming for a precise measurement of the fluxes and energy spectra for secondary particles produced by 4He, 12C and 16O ion beams of therapeutic energies impinging on thick PMMA phantoms.
The precise knowledge of the secondary particles production is a key ingredient for both Treatment Planning Software (TPS) development, allowing to improve the MC description of the ion beams interaction with the patient body, and for dose monitoring research and development. In this presentation we present the production of charged and neutral secondary particles, as well as the production of photons that are the result of a beta+ annihilation, for the different energies and experimental setup explored. The fluxes, energy spectra and correlation with the Bragg Peak (BP) position will be shown, together with the expected resolution on the BP position for a typical treatment scenario.

The measurements performed in the different facilities, provided a solid evidence that the rate of produced protons and prompt photons is large enough to supply the particle sample needed for a fast online monitor operating during a typical treatment that will be capable to provide the (millimetric) spatial resolution required by clinical standards.

Primary author: SARTI, Alessio (LNF)

Co-authors: SCIUBBA, Adalberto (ROMA1); RUSSOMANDO, Andrea (ROMA1); VOENA, Cecilia (ROMA1); PINCI, Davide (ROMA1); SOLFAROLI CAMILLOCCI, Elena (INFN); DE LUCIA, Erika (LNF); COLLAMATI, FRANCESCO (ROMA1); Dr BELLINI, Fabio (ROMA1); FERRONI, Fernando (ROMA1); COLLINI, Francesco (PI); BATTISTONI, Giuseppe (MI); MATTEI, ILARIA (L); PIERSANTI, Luca (R); Prof. DURANTE, Marco (TIFP); TOPPI, Marco (INFN-Roma, Italy); SENZACQUA, Martina (ROMA1); Dr MARAFINI, Michela (Centro Fermi); FACCINI, Riccardo (ROMA1); PARAMATTI, Riccardo (ROMA1); MORGANTI, Silvio (ROMA1); PATERA, Vincenzo (ROMA1)

Presenter: TOPPI, Marco (INFN-Roma, Italy)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **130** Type: **Poster**

Transfer to the continuum calculations of quasifree (p,pn) and (p,2p) reactions

Primary authors: Mr GOMEZ RAMOS, Mario (University of Seville); Mr ANTONIO, Moro (Universidad de Sevilla, Spain)

Presenter: Mr GOMEZ RAMOS, Mario (University of Seville)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **131** Type: **Oral presentation**

Fusion and neutron transfer reactions with weakly bound nuclei within time-dependent and coupled channel approaches

Thursday, June 25, 2015 3:40 PM (20 minutes)

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The numerical solving of the time-dependent Schrödinger equation (TDSE) provides new possibilities for theoretical study of transfer reactions and the first (capture) stage of fusion reactions [1, 2]. In this model the motion of nuclei cores is described on basis of the classical physics. The small typical grid spacing (~ 0.2 fm) of TDSE method leads to correct calculations of the spatial structure of the external (valence) neutron wave function with the formation of two center (molecular) states (Fig. 1a) [3, 4]. The traditional coupled channel approach was combined with the TDSE method [2, 5]. The value of the coupling strength was determined by time-dependent two-center level populations. The coupling matrix elements were determined by the two-center wave functions of the valence neutron. They were calculated within the two-center shell model based on the Bessel series [2]. Results of the cross section calculation for the formation of the 198Au (Fig. 1b) and fusion (Fig. 1c) in the 6He+197Au reaction [6, 7] and for the formation 65Zn isotopes and fusion in 6He+64Zn reaction [8] agree satisfactorily with the experimental data near the barrier. A few additional three-body and two-body quantum models were used for more careful study the processes of neutron transfer, breakup of the weakly bound nucleus 6He and sub-barrier fusion. They are: one and two nuclear cores plus one [1] and two valence neutrons, one and two cores plus a di-neutron.

Fig. 1. a) The probability density of the valence neutrons of the 6He nucleus during a frontal collision with the 64Zn at energy in the center of mass system MeV, a scale factor is 1 fm, and radii of the circumferences equal to radii of the nuclei. b, c) The excitation functions for the formation of the 198Au isotope (b) and fusion (c) in the reaction 6He+197Au. Experimental data (circles) is from [6, 7]. Theoretical curves were calculated within the coupled channel approach (solid lines) and the TDSE method (dashed line); VB is the Coulomb barrier.

[1] V. I.Zagrebaev, V. V. Samarin and W. Greiner, Phys. Rev. C. 75, 035809 (2007)
[2] V. V. Samarin, Phys. Atom. Nucl. 78, 128 (2015)
[3] V. V. Samarin, EPJ Web Conf. 66, 03075 (2014)
[4] V. V. Samarin, EPJ Web Conf. 86, 00040 (2015)
[5] V. V. Samarin, EPJ Web Conf. 86, 00039 (2015)
[6] Yu. E. Penionzhkevich et al., Eur. Phys. J. A 31, 185 (2007)
[7] A. Kulko et al., J. Phys. G 34, 2297 (2007)
[8] V. Scuderi et al., Phys. Rev. C. 84, 064604 (2011)

Primary author: Prof. SAMARIN, Viacheslav (Flerov Laboratory of Nuclear Reactions, the Joint Institute for Nuclear Research, Dubna, Russia)

Presenter: Prof. SAMARIN, Viacheslav (Flerov Laboratory of Nuclear Reactions, the Joint Institute for Nuclear Research, Dubna, Russia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **132** Type: **Oral presentation**

Theoretical studies of possible toroidal high-spin isomers in the light-mass region

Tuesday, June 23, 2015 2:55 PM (20 minutes)

Primary author: Dr STASZCZAK, Andrzej (Maria Curie-Sklodowska University, Lubkin, Poland)

Co-author: Dr WONG, Cheuk-Yin (Oak Ridge National Laboratory)

Presenter: Dr STASZCZAK, Andrzej (Maria Curie-Sklodowska University, Lubkin, Poland)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **133** Type: **Oral presentation**

Impact of the in-medium conservation of energy on the pi-/pi+ multiplicity ratio

Tuesday, June 23, 2015 5:25 PM (20 minutes)

Primary author: Dr COZMA, Dan (IFIN-HH, Bucharest, Romania)

Presenter: Dr COZMA, Dan (IFIN-HH, Bucharest, Romania)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **134** Type: **Poster**

Statistical treatment of the decaying cascade of an excited nucleus - focus on the gamma emission down to the ground state

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Nuclear fission is a complex process and its description is a theoretical challenge. Several questions are still open such as the sharing of the total excitation energy between the fragments as well as their spin distribution. In this framework, experiments [1] were performed at ILL (Institut Laue-Langevin, Grenoble, France) with the EXILL setup to measure the prompt gamma-ray cascade related to the de-excitation of fission fragments. Is it possible to reach the characteristics of fission fragments at scission from the measurement of their gamma-ray cascade and, subsequently, to constrain the fission models?
To simulate the de-excitation phase of the fission fragments we used an upgraded version of the code Kewpie2 [2]. The latter handles the competition between light particles evaporation, fission and gamma-ray emission using classic statistical formalisms, i.e. Weisskopf-Ewing or Hauser-Feshbach for light particles evaporation, Bohr-Wheeler for fission and, Weisskopf for gamma-ray emission. As Kewpie2 was initially devoted to the decay of heavy and super-heavy nuclei, a specific scheme based on Bateman equations was developed to take account of very small probabilities. It allows computing both statistical and dynamical observables such as the survival probability of a decaying nucleus [3] and the fission time distribution [4].
In order to further constrain the statistical code with the new experimental data discussed above, several modifications were made on Kewpie2 to simulate the whole gamma-ray cascade down to the ground state. It requires the implementation of the nuclear level schemes, the improvement of the gamma decay with gamma strength functions, the treatment of the coupling from continuum to discrete levels as well as the whole spin distribution… Kewpie2 permits also to incorporate physics coming from microscopic models like level densities which are the most important physical ingredients of statistical formalisms.
We will present the code Kewpie2 and the physicals ingredients needed for the statistical formalisms. Then, the various improvements made to treat the whole gamma-rays cascade down to the ground state will be discussed. Finally, the results of Kewpie2 on the prompt-gamma cascade of fission fragments will be compared to experimental data.

[1] T. Materna et al., Proc. of CGS15 (Dresden), to be published
[2] B. Bouriquet et al., Comp. Phys. Comm. 159, 1 (2004), H. Lu et al., in preparation
[3] Y. Abe et al., Int. J. Mod. Phys. E 16, 491 (2007)
[4] D. Boilley et al., Int. J. Mod. Phys. E 17, 1681 (2008)

Primary author: Dr MARCHIX, Anthony (CEA, Centre de Saclay, IRFU/SPhN, F-91191 Gif-sur-Yvette, France)

Co-authors: Dr LETOURNEAU, Alain (CEA, Centre de Saclay, IRFU/SPhN, F-91191 Gif-sur-Yvette, France); Dr MATERNA, Thomas (CEA, Centre de Saclay, IRFU/SPhN, F-91191 Gif-sur-Yvette, France)

Presenter: Dr MARCHIX, Anthony (CEA, Centre de Saclay, IRFU/SPhN, F-91191 Gif-sur-Yvette, France)

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **135** Type: **Oral presentation**

Study on the Neutron-Neutron Correlation in 8He

Thursday, June 25, 2015 3:55 PM (20 minutes)

Primary author: Dr YANG, Zaihong (Peking University, Beijing, China)

Co-author: Prof. YE, Yanlin (Peking University)

Presenter: Dr YANG, Zaihong (Peking University, Beijing, China)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **136** Type: **Oral presentation**

Status and Perspective of the FARCOS detector array

Thursday, June 25, 2015 3:40 PM (20 minutes)

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{\large \bf Status and Perspective of the FARCOS detector array}
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\begin{center}
% insert the authors here. The presenter is underlined
\underline{E.V. Pagano}[1,2], L. Acosta[4], R. Andolina[1], L. Auditore[5], C. Boiano[6], G. Cardella[3], A. Castoldi[7] D'Andrea[3], E. De Filippo[3], S. De Luca[5], D. Dell'Aquila[8], L. Francalanza[8], E. Geraci[1,3], B. Gnoffo[3], C. Guazzoni[6,7], G. Lanzalone[2,9], I. Lombardo[8], N. Martorana[1,2], T. Minniti, S. Norella[5], A. Pagano[3], M. Papa[3], S. Pirrone[3], G. Politi[1,3], F. Porto[1,2], L. Quattrocchi[5], F. Rizzo[1,2], P. Russotto[3], G. Sacca'[3], A. Trifiro'[5], M. Trimarchi[5] , G. Verde[3,10], M. Vigilante[8].
\end{center}

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{\em [1]Universita' di Catania, Catania, Italy} \\
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{\em [3] INFN sezione di Catania, Catania, Italy }\\
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{\em [6] INFN sezione di Milano, Milano, Italy }\\
{\em [7] Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Milano, Italy }\\

{\em [8] INFN sezione di Napoli e Dipartimento di Fisica, Universita' di Napoli Federico II, Napoli, Italy }\\
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Nuclear matter under extreme conditions can be studied in the laboratory with heavy- ion (H.I.) collisions. In this case one can indeed vary both the incident energy and mass asymmetry. By exploring different impact parameters and rapidity regions it is possible to access nuclear densities that extends above and below saturation density. Such opportunities allow one to learn more about the nuclear equation of state and its implications in astrophysics phenomena such as supernovae explosions and neutron stars properties. Furthermore, during the dynamical evolution of the studied systems short living exotic states can be produced and their properties can be studied by detecting the final products of resonance decays. All these phenomena involve time scales that need to be accessed with multi- particle correlation measurements.
Experimental observables, such as linear momentum and energy, sensitive to both space-time and spectroscopic properties of the nuclear systems produced in the H.I. collisions, need to be measured with both high angle and energy resolution over a large solid angle coverage. In order to address this problem dedicated geometrically flexible correlator arrays are useful tools to be coupled with 4π detectors. One of these arrays is FARCOS, presently under construction at the INFN Sezione di Catania and Laboratori Nazionali del Sud (LNS). The FARCOS (Femtoscope ARray for COrrelations and Spectroscopy) will consist of an array of twenty telescopes, each composed by two Double Sided Silicon Strip Detectors (DSSSD), of thickness 300?m and 1500?m, respectively, followed by four CsI(Tl) crystals read-out by silicon photodiodes. In this contribution a brief report of the present status of FARCOS array and future perspectives will be presented. Particular attention will be devoted to some preliminary results obtained in a recent experiment performed using a prototype of 4 clusters of FARCOS coupled with CHIMERA detector[1].

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% write your references here
[1] E.V. Pagano \emph{et al.}, EPJ Web of Conferences (2015) in press.

\end{document}

Primary author: PAGANO, Emanuele Vincenzo (INFN-LNS, Catania, Italy)

Presenter: PAGANO, Emanuele Vincenzo (INFN-LNS, Catania, Italy)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **137** Type: **Oral presentation**

Dissipation strength of the tilting degree of freedom in fusion-fission reactions

Tuesday, June 23, 2015 6:45 PM (20 minutes)

Primary author: NADTOCHY, Pavel (Omsk State University, Russia)

Co-authors: Dr VANIN, Danil (Omsk State University); Dr RYABOV, Eugeny (Omsk State University); Prof. ADEEV, Gennady (Omsk State University)

Presenter: NADTOCHY, Pavel (Omsk State University, Russia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **138** Type: **Invited Talk - Parallel Session**

Three-body force effect on the properties of neutron-rich nuclear matter

Thursday, June 25, 2015 2:55 PM (25 minutes)

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We present an upgraded review of our microscopic investigation on the single-particle properties and the EOS of isospin asymmetric nuclear matter within the framework of the Brueckner theory extended
to include a microscopic three-body force. We pay special attention to the discussion of the three-body force effect and the comparison of our results with the predictions by other ab initio approaches. Three-body force is shown to be necessary for reproducing the empirical saturation properties of symmetric nuclear matter within nonrelativistic microscopic frameworks, and also for extending the hole-line expansion to a wide density range. The three-body force effect on nuclear symmetry energy is repulsive, and it leads to a significant stiffening of the density dependence of symmetry energy at supra-saturation densities. Within the Brueckner approach, the three-body force affects the nucleon s.p. potentials primarily via
its rearrangement contribution which is strongly repulsive and momentum-dependent at high densities and high momenta. Both the rearrangement contribution induced by the three-body force and the effect of ground state correlations are crucial for predicting reliably the single-particle properties within the Brueckner framework.

Primary authors: BOMBACI, Ignazio (PI); LOMBARDO, Umberto (LNS); Prof. ZUO, Wei (Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China)

Presenter: Prof. ZUO, Wei (Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **139** Type: **Poster**

Competition of kaon and hyperon mixture in nuclear matter

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It is well-known that mixture of hyperons and kaons in nuclear matter cause softening of matter due to a strong attraction or increased number of degree of freedom. This softening is one of the most serious problems in nuclear physics since one has to sustain an observed heavy neutron star with twice the solar mass.
On the other hand, we have investigated the competition of kaon and hyperon mixture in nuclei [1]. Then we found that all the kaons put in nuclei are absorbed in nucleons and converted into hyperons.
In this presentation we discuss the competition between kaons and hyperons in nucleaer matter in the core of neutron stars.
We also discuss the effect of degenerate electrons and inhomogeneous structures of matter.

1. T. Muto, T. Maruyama, and T. Tatsumi, EPJ Web Conf. 73 (2014) 05007

Primary author: Dr MARUYAMA, Toshiki (Japan Atomic Energy Agency)

Co-authors: Dr YASUTAKE, Nobutoshi (Chiba Institute of Technology); Prof. MUTO, Takumi (Chiba Institute of Technology); Dr TATSUMI, Toshitaka (Kyoto University)

Presenter: Dr MARUYAMA, Toshiki (Japan Atomic Energy Agency)

Track Classification: Nuclear Astrophysics

Contribution ID: **140** Type: **Oral presentation**

Hermes results on 3D imaging of the nucleon

Monday, June 22, 2015 4:45 PM (20 minutes)

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In the context of rapid theoretical developments in non-perturbative QCD, a formalism of Transverse Momentum Dependent parton distribution functions (TMDs) and of Generalized Parton Distributions (GPDs) was introduced in the last two decades, providing a more comprehensive multi-dimensional description of the nucleon. TMDs and GPDs allow in fact for complementary descriptions of the nucleon in three dimensions (nucleon tomography), spanned by the quarks longitudinal momenta and, respectively, by the their transverse momenta components and transverse spatial coordinates. They thus contribute, with different approaches, to the full phase-space description of the nucleon structure. Furthermore, they provide complementary insights into the yet unmeasured quark orbital angular momentum. Experimentally, TMDs and GPDs can be accessed through the analysis of specific azimuthal asymmetries measured, respectively, in semi-inclusive deep-inelastic scattering and hard exclusive processes, such as hard leptoproduction of real photons or mesons. The HERMES experiment has collected wealth of data on scattering of a longitudinally polarized lepton (electron or positron) beam from HERA off unpolarized, longitudinally and transversely polarized internal gas targets. Collected data allowed to measure a variety of asymmetries with respect to beam charge, beam helicity and target polarization. A selection of HERMES results on observables sensitive to TMDs and GPDs will be presented.

Primary author: Dr PAPPALARDO, Luciano Libero (Universita' degli Studi di Ferrara, Italy)

Presenter: Dr PAPPALARDO, Luciano Libero (Universita' degli Studi di Ferrara, Italy)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **141** Type: **Oral presentation**

Effects of couplings to breakup channels in reactions induced by weakly bound and halo nuclei.

Monday, June 22, 2015 4:05 PM (20 minutes)

Primary author: FERNANDEZ GARCIA, Juan Pablo (INFN-LNS, Catania, Italy)

Co-authors: DI PIETRO, Alessia Francesca (LNS); Dr MORO, Antonio (Universidad de Sevilla); TORRESI, Domenico (LNS); LATTUADA, Marcello (LNS); Mrs FISICHELLA, Maria (LNS); Dr ZADRO, Mile (Ruđer Bošković Institute, Bijenička cesta 54, HR-10000 Zagreb, Croatia); FIGUERA, Pierpaolo (LNS); Dr SCUDERI, Valentina (LNS)

Presenter: FERNANDEZ GARCIA, Juan Pablo (INFN-LNS, Catania, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **142** Type: **Oral presentation**

Collectivity beyond N=40 in neutron-rich Cr and Fe isotopes.

Monday, June 22, 2015 4:20 PM (20 minutes)

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After the discovery of an enhanced collectivity in the N=40 Cr and Fe isotopes below Z=28, the evolution of collectivity beyond N=40 and the position of the collectivity maximum is still an open question. The first campaign of the Shell Evolution And Search for Two plus Energies At the RIBF (SEASTAR) scientific program took place in Spring 2014 at the Radioactive Isotope Beam Factory. It focused on the spectroscopy of the more neutron-rich attainable nuclei such as Cr and Fe N>40 isotopes via proton knockout reactions with the unique combination of the DALI2 gamma array with the MINOS device. MINOS is a new device composed of a thick liquid hydrogen target and a Time Projection Chamber (TPC). The charged particles produced by knockout reactions are detected in the TPC and enable the reconstruction of the reaction vertex with the use of a tracking algorithm, thus ensuring an optimal Doppler correction for the measured gamma rays.
The first analysis results of the SEASTAR campaign will be presented with the first spectroscopy of 66Cr and 70,72Fe. The performances of the MINOS TPC will also be detailed.

Primary authors: Dr OBERTELLI, Alexandre (CEA Saclay); Mrs SANTAMARIA, Clementine (CEA Saclay, France); Dr LOUCHART, Corinne (TU Darmstadt); Dr NOWACKI, Frédéric (IPHC Strasbourg); Dr DOORNENBAL, Pieter (RIKEN); WERNER, Volker (TU Darmstadt)

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Presenter: Mrs SANTAMARIA, Clementine (CEA Saclay, France)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **143** Type: **Oral presentation**

Primordial nucleosynthesis revised: the THM contribution

Thursday, June 25, 2015 6:10 PM (20 minutes)

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\TITLE{Primordial nucleosynthesis revised: the THM contribution}\\[3mm]
%%%
%%% Authors and affiliations are next. The presenter should be
%%% underlined as shown below.
%%%
\AUTHOR{R.G. Pizzone[1], C. Bertulani[3], R. Spart\’a[1,2], C. Spitaleri[1,2], M. La Cognata[1], L. Lamia[2], A. Mukhamedzhanov[4]\\
%%%
{\small \it
\affiliation{[1]INFN - Laboratori Nazionali del Sud, Catania, Italy \\
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[3]Department of Physics and Astronomy, Texas A\&M University, Commerce, TX, USA \\
[4] Cyclotron Institute, Texas A\& M University, College Station, TX, USA\\}
%\AFFILIATION{*}{Present address Dipartimento della Protezione Civile, Roma, Italy}
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% Enter contact e-mail address here.

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%%%
%%% Abstract proper starts here.
%%%
Big Bang Nucleosynthesis (BBN) nucleosynthesis requires several nuclear physics inputs and, among them, an important role is played by nuclear reaction rates. They are among the most important input for a quantitative description of the early Universe. An up-to-date compilation of direct cross sections of d(d,p)t, d(d,n)^{3}He and ^{3}He(d,p)^{4}He reactions is given, being these ones among the most uncertain bare-nucleus cross sections.

An intense experimental effort has been carried on in the last decade to apply the Trojan Horse Method (THM) to study reactions of relevance for the BBN and measure their astrophysical S(E)-factor. The result of these recent measurements is reviewed and compared with the available direct data.
%Some of the most uncertain bare nucleus cross sections of interest for the primordial nucleosynthesis were then measured by means of the Trojan Horse Method in the energy range relevant for the early phases of the Universe's life. The reaction rates for these reactions (d(d,pt), d(d,^{3}He)n, ^{3}He(d,p)^{4}He and ^{7}Li(p,α)^{4}He) were then calculated and compared with the available compilations. The reaction rates and the relative error for the four reactions of interest are then numerically calculated in the temperature ranges of relevance for BBN ($0.01 < T_9 < 10$) and compared with up-to-date reaction rate compilations.
Their value were therefore used as input physics for primordial nucleosynthesis calculations in order to evaluate their impact on the calculated primordial abundances of D, ^{3,4}He and ^{7}Li. These ones were then compared with the observational primordial abundance estimates in different astrophysical sites. A comparison was also performed with calculations using other reaction rates compilations available in literature.

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Primary author: PIZZONE, Rosario (INFN-LNS, Catania, Italy)

Presenter: PIZZONE, Rosario (INFN-LNS, Catania, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **144** Type: **Poster**

9Be scattering within a four-body CDCC framework

Primary authors: Mr CASAL, Jesús (Dpto. de Física Atómica, Molecular y Nuclear. Universidad de Sevilla); Dr ARIAS, José Miguel (Dpto. de Física Atómica, Molecular y Nuclear. Universidad de Sevilla); Dr RODRÍGUEZ-GALLARDO, Manuela (Dpto. de Física Atómica, Molecular y Nuclear. Universidad de Sevilla)

Presenter: Mr CASAL, Jesús (Dpto. de Física Atómica, Molecular y Nuclear. Universidad de Sevilla)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **145** Type: **Poster**

Influence of Mass of the Fragmenting System on Projectile Multifragmentation Spectrum at Dubna Energy

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The multifragment decays of Mg projectiles after collisions with various emulsion targets at a bombarding energy of 4.5 AGeV has been studied. The bound charge Z(b), which is the sum of all the projectile fragments with charge Z(PF) ≥ 2, is considered to be one of the important observable in the study of projectile multifragmentation. Correlation between mean number of intermediate mass fragments N(IMF) and Z(b) is one of the most interesting aspects of studying projectile multifragmentation. In this report an attempt has been made to study the variation of N(IMF) on the mass of the fragmenting system Z(b) for Mg-Em interaction at 4.5 AGeV. A rise and fall pattern in N(IMF) vs Z(b) plot with the maximum value of N(IMF) corresponding to the value of Z(b) = 6-7 is observed for the Mg-Em system. The value of bound charge corresponding to the maximum value of average number of intermediate mass fragments is found to be consistent with the results reported by ALADIN group[1-5]. The variation of N(IMF) on Z(b) normalized with the projectile charge Z(p) indicates a clear size effect for the studied systems.

Primary author: Dr TALUKDAR, RUPALIM (DEPARTMENT OF PHYSICS, QASSIM UNIVERSITY, KSA)

Presenter: Dr TALUKDAR, RUPALIM (DEPARTMENT OF PHYSICS, QASSIM UNIVERSITY, KSA)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **146** Type: **Poster**

New measurement of the 10B(p,a0)7Be reaction cross section at low energies and the structure of 11C

Primary author: Dr LOMBARDO, Ivano (Univ. Napoli Federico II and INFN - Napoli)

Co-authors: Dr ORDINE, Antonio (INFN - Napoli); Dr DELL'AQUILA, Daniele (Univ. Napoli Federico II and INFN - Napoli); Prof. ROSATO, Elio (Univ. Napoli Federico II and INFN - Napoli); Prof. SPADACCINI, Giulio (Univ. Napoli Federico II and INFN - Napoli); Prof. LA COMMARA, Marco (Univ. Napoli Federico II and INFN - Napoli); Prof. VIGILANTE, Mariano (Univ. Napoli Federico II and INFN - Napoli)

Presenter: Dr LOMBARDO, Ivano (Univ. Napoli Federico II and INFN - Napoli)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **147** Type: **Invited Talk - Parallel Session**

An Overview of Resonance Measurements at the ALICE Experiment

Tuesday, June 23, 2015 5:25 PM (25 minutes)

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Resonances play a unique role in the study of ultra-relativistic heavy-ion collisions. Resonance yields, which may be modified by rescattering and regeneration after hadronization, can be used to study the properties of the hadronic phase of the collision. The modification of resonance masses or widths would be a signature of chiral symmetry restoration near the phase transition temperature. The transverse-momentum spectra of the proton and the $\phi(1020)$ can be used to study the mechanisms of particle production. In addition, resonance measurements in pp and p–Pb collisions help to distinguish initial-state effects from the effects of the hot and dense final state. The ALICE Collaboration has studied the $\mathrm{K}^{*}(892)^{0}$ and $\phi(1020)$ mesons in pp, p–Pb, and Pb–Pb collisions. Measurements of many resonance properties, including p_{T} spectra, integrated yields, masses, widths, mean p_{T} values, and the nuclear modification factors R_{AA} and R_{pPb}, will be presented and compared to measurements from other experiments, non-resonances, and the predictions of theoretical models.

Primary author: Dr KNOSPE, Anders (The University of Texas at Austin, Bozeman, USA)

Presenter: Dr KNOSPE, Anders (The University of Texas at Austin, Bozeman, USA)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **148** Type: **Poster**

States of 13C with abnormal radii

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The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy

States of 13C with abnormal radii

A. Demyanova1, A. Ogloblin1, A. Danilov1, T. Belyaeva2, S. Goncharov3, W. Trzaska4

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2Universidad Autonoma del Estado de Mexico, Toluca, 50000, Mexico
3Lomonosov Moscow State University, Moscow, 119991, Russia
4JYFL, Jyvaskyla, Finland

In our previous experiment on the inelastic scattering 13C (α,α’) at E(α) = 65 MeV [1] we claimed the observation of three excited states whose radii differed from that of the ground state: 3.09 MeV (1/2+), 8.86 MeV ($1/2^-$) and 9.90 MeV ($3/2^-$). In this paper we continued the analysis including in it some other data. The evaluation of radius of the 3.09 MeV state was performed by three independent methods, Modified diffraction model (MDM) [2], Nuclear rainbow method (NRM) [3, 4] and method using the asymptotic normalization coefficients (ANC) [5, 6]. The radius occurred to be enhanced in good agreement with theoretical predictions [7] demonstrating the existence of a neutron halo in this state. All three approaches gave similar values verifying the validity of the used methods. Application of MDM and NRM to the 8.86 MeV state showed that the latter also has an enhanced radius close to that of the Hoyle state (7.65 MeV, 0+) of 12C [2]. The radius value of the 9.90 MeV remains an open question. The estimates done both by MDM and NRM methods gave the value less than that of the ground state. As this state is considered to be the head of the $3/2^-$ rotational band [8], and its enhanced radius is predicted [9] a more elaborate analysis of the problem is required. Because of the importance of the obtained result new measurements of the inelastic scattering 13C (α,α’) at E(α) = 90 MeV were performed. The analysis is in progress.

[1] A.S. Demyanova et al., EPJ Web of Conferences 66, 02027 (2014)
[2] A.N. Danilov et al., Phys. Rev. C 80, 054603 (2009)
[3] S.Ohkubo and Y. Hirabayashi, Phys. Rev. C 75, 044609 (2007)
[4] A.S. Demyanova et al., Int. J. Mod. Phys. E 20, No 4, 915 (2011)
[5] Z.H. Liu et al., Phys. Rev. C 64, 034312 (2001)
[6] T.L. Belyaeva et al., Phys.Rev. C 90, 064610-1 (2014)
[7] T. Yamada and Y. Funaki, Int. J. Mod. Phys. E 17, 2101 (2008)
[8] M. Milin and W. von Oertzen, Eur. Phys. J. A 14, 295 (2002)
[9] N. Furutachi, M. Kimura, Phys. Rev. C 83, 021303® (2011)

Primary author: Dr DEMYANOVA, Alla (NRC Kurchatov Institute)

Co-authors: Prof. OGLOBLIN, Alexey (Kurchatov institute); Mr DANILOV, Andrey (Kurchatov Institute, Moscow, Russia); Prof. GONCHAROV, Sergey (MSU, Moscow, Russia); Prof. BELYAEVA, Tatyana (Universidad Autonoma del Estado de Mexico); Dr TRZASKA, Wladislaw (JYFL, Jyvaskyla, Finland)

Presenter: Dr DEMYANOVA, Alla (NRC Kurchatov Institute)

Track Classification: Nuclear Structure

Contribution ID: **149** Type: **Poster**

Cluster rotational bands in 11B

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The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy

Cluster rotational bands in 11B

A. Danilov1, A. Demyanova1, A. Ogloblin1, T. Belyaeva2, S. Goncharov3, W. Trzaska4

1 National Research Center “Kurchatov Institute”, Moscow, 123182, Russia
2 Universidad Autonoma del Estado de Mexico, Toluca, 50000, Mexico
3 Lomonosov Moscow State University,Moscow, 119991, Russia
4 The Accelerator Laboratory of the Department of Physics of the University of Jyväskylä, Jyvaskula, Finland

Differential cross-sections of the 11B + α inelastic scattering at E(α) = 65 MeV leading to the most of the known 11B states at the excitation energies up to 14 MeV were measured [1]. The data analysis was done by DWBA and in some cases by the Modified Diffraction Model [2] allowing determining the radii of the excited states. The radii of the states with excitation energies less than ~ 7 MeV with the accuracy not less than 0.1-0.15 fm coincide with the radius of the ground state. This result is consistent with the traditional view of the shell structure of the low-lying states in 11B. Most of the observed high-energy excited states are distributed among four rotational bands:
K = 3/2-: 8.56 (3/2-) – 10.34 (5/2-) – 11.60 – 13.14 (9/2-) MeV,
K = 1/2+: 6.79 (1/2+) – 9.88 (3/2+) – 11.60 (5/2+) – 13.16 (7/2+) MeV,
K = 3/2+: 7.98 (3/2+) – 9.27 (5/2+) – 10.60 (7/2+) – 12.63 (9/2+) MeV,
K = 5/2+: 7.29 (5/2+) – 9.19 (7/2+) – 11.27 (9/2+) MeV.

Fig. 1. Predicted [3,4] rotational bands in 11B at excitation energies higher 7 MeV. For comparison, rotational band [5], based on the Hoyle state (0+2. 7.65 MeV) of 12C, is shown.

The moments of inertia of band states are close to the moment of inertia of the Hoyle state of 12C. The determined radii, related to these bands, are 0.7 - 1.0 fm larger than the radius of the ground state, and are close to the radius of the Hoyle state. These results are in agreement with existing predictions about various cluster structure of 11B at high excitation energies.

[1] A.N. Danilov, A.S. Demyanova et al., Physics of Atomic Nuclei, in print
[2] A.N. Danilov et al., Phys.Rev. C 80, 054603 (2009)
[3] T. Suhara and Y. Kanada-En’yo, Phys. Rev. C 85, 054320 (2012)
[4] H. Yamaguchi et al., Phys. Rev. C 83, 034306 (2011)
[5] A.A. Ogloblin et al., EPJ Web of Conferences, 66, 02074 (2014)

Primary author: Mr DANILOV, Andrey (Kurchatov Institute, Moscow, Russia)

Co-authors: Prof. OGLOBLIN, Alexey (Kurchatov institute); Dr DEMYANOVA, Alla (NRC Kurchatov Institute); Prof. GONCHAROV, Sergey (MSU, Moscow, Russia); Prof. BELYAEVA, Tatyana (Universidad Autonoma del Estado de Mexico); Dr TRZASKA, Wladislaw (JYFL, Jyvaskyla, Finland)

Presenter: Mr DANILOV, Andrey (Kurchatov Institute, Moscow, Russia)

Track Classification: Nuclear Structure

Contribution ID: **150** Type: **Poster**

Determination of integral cross sections of 3H in Al foils monitors irradiated by protons with energies 40 to 2600 MeV

Primary author: Prof. TITARENKO, Yury (Institute for Theoretical and Experimental Physics)

Co-authors: Dr STANKOVSKIY, Alexey (SCK•CEN); Dr TITARENKO, Alexey (Institute for Theoretical and Experimental Physics); Dr KASIRIN, Igor (Institute for Theoretical and Experimental Physics); Dr PAVLOV, Kirill (Institute for Theoretical and Experimental Physics); Mrs CHAUZOVA, Mariya (Institute for Theoretical and Experimental Physics); Dr MALINOVSKIY, Sergey (Malinovskiy); Dr MASHNIK, Stepan (LANL); Dr ZHIVUN, Valeriy (Institute for Theoretical and Experimental Physics); Dr ROGOV, Victor (Institute for Theoretical and Experimental Physics); Dr BATYAEV, Vyacheslav (Institute for Theoretical and Experimental Physics)

Presenter: Prof. TITARENKO, Yury (Institute for Theoretical and Experimental Physics)

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **151** Type: **Oral presentation**

A nuclear convergent close-coupling formalism

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{\large \bf A nuclear convergent close-coupling formalism}
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\begin{center}
% insert the authors here. The presenter is underlined
\underline{P. R. Fraser}[1], A. Kadyrov[1]
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] ARC Centre for Antimatter-Matter Studies, Curtin University,
Australia} \\
\end{center}

% write your abstract here
Increased understanding of unstable nuclei is of great importance for
problems in cosmology and astrophysics, and while a vibrant
international community has emerged to study these systems through
scattering processes, full understanding of the effects of the
high-energy continuum on such processes remains elusive.

The popular continuum discretised coupled-channels (CDCC) [1,2]
method of nuclear physics, and the successful convergent
close-coupling (CCC) [3,4] approach of atomic physics,
both consider scattering of composite two- or three-body projectiles
unitary or strongly bound targets. In CDCC, projectiles are

loosely-bound nuclei and targets are stable, usually heavier, nuclei. In CCC, scattering is studied between hydrogen-like atoms and electrons or protons, as well as their antimatter counterparts. In the systems of interest for both models, not only is a set of discrete states relevant, but also the high-energy continuum. To consider it in calculations, the continuum must be, in some convincing way, 'discretised'.

Indeed, there are similarities between atomic and nuclear problem-solving techniques which are yet to be capitalised upon. The CCC method, having been greatly successful in atomic physics, has much to contribute to nuclear scattering problems, having overcome several mathematical, numerical and physical problems still faced in CDCC. These include a two-centre approach for stripping reactions [5]. Details of the approach will be presented, along with preliminary results.

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[1] M. Yahiro \emph{et al.}, Prog. Theor. Exp. Phys. 01A206 (2012)

[2] N. Austern \emph{et al.}, Phys. Rep. {\bf 154}, 125 (1987)

[3] I. Bray and A.T. Stelbovics, Phys. Rev. Lett. {\bf 69}, 53 (1992)

[4] I. Bray and A. T. Stelbovics, Phys. Rev. {\bf A46}, 6995 (1992)

[5] A. S. Kadyrov \emph{et al.}, Ann. Phys. {\bf 324}, 1516 (2009)

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Primary author: Dr FRASER, Paul (Curtin University)

Co-authors: Prof. KADYROV, Alisher (Curtin University); Prof. BRAY, Igor (Curtin University)

Presenter: Dr FRASER, Paul (Curtin University)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **152** Type: **Oral presentation**

Neutron rich Lambda hypernuclei study with the FINUDA experiment

Tuesday, June 23, 2015 4:20 PM (20 minutes)

Primary author: Mrs BUFALINO, Stefania (TO)

Presenter: Mrs BUFALINO, Stefania (TO)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **154** Type: **Oral presentation**

Shear Viscosity to electric conductivity ratio for the Quark-Gluon Plasma

Tuesday, June 23, 2015 5:50 PM (20 minutes)

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Transport coefficients of strongly interacting matter are currently subject of intense studies due to their relevance for the characterization of the quark-gluon plasma (QGP) produced in ultra-relativistic heavy-ion collisions (uRHIC).
We discuss the connection between the shear viscosity to entropy density ratio, η/s,
and the electric conductivity, σ_{el}: we find that a minimal eta/s is consistent with a low value of electric conductivity as measured in recent lattice QCD calculations.
More generally we show that the ratio of η/s over σ_{el}/T supplies a measure of the quark to gluon scattering rates whose knowledge would allow to significantly advance in the understanding of the QGP phase.
We also predict that $(\eta/s)/(\sigma_{el}/T)$, independently on the running coupling $\alpha_s(T)$, should increase up to about ~ 20 for $T \to T_c$, while it goes down to a nearly flat behaviour around $\simeq 4$ for $T \geq 4T_c$.

Primary author: PUGLISI, Armando (INFN-LNS, Catania, Italy)

Co-authors: PLUMARI, Salvatore (LNS); Dr GRECO, Vincenzo (LNS)

Presenter: PUGLISI, Armando (INFN-LNS, Catania, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **155** Type: **Oral presentation**

Time evolution of heave quark distribution function in quark gluon plasmas: Laplace transform approach

Thursday, June 25, 2015 4:20 PM (20 minutes)

Primary author: Mrs MEHRABI PARI, Sharareh (Department of Physics, Ferdowsi university,Mashhad,Iran & Department of Physics and Technology, University of Bergen, Bergen, Norway)

Co-authors: Mrs TAGHAVI SHAHRI, Fatemeh (Department of Physics, Ferdowsi university of Mashhad, Mashhad, Iran); Mr JAVIDAN, Kurosh (Department of Physics, Ferdowsi university of mashhad, Mashhad, Iran)

Presenter: Mrs MEHRABI PARI, Sharareh (Department of Physics, Ferdowsi university,Mashhad,Iran & Department of Physics and Technology, University of Bergen, Bergen, Norway)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **156** Type: **Oral presentation**

Thermalization. equilbration and particle production in quark-gluon plasma

Tuesday, June 23, 2015 4:00 PM (20 minutes)

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We discuss the problems of local thermalization, equilibration and particle productions in quark-gluon plasma produced in ultrarelativistic heavy ion collisions. We implement several kinds of initial conditions, which mimick the initial strong color glasma fields produced by the high energy collision. Once an initial condition for a fireball is specified, we use relativistic transport theory to simulate the dynamical evolution of the fireball, and to study in particular the thermalization and equilibration times, as well as the particle production by means of inelastic QCD processes and decay of the color flux tubes.

Primary author: Dr RUGGIERI, Marco (Catania University, Italy)

Co-authors: PUGLISI, Armando (LNS); SCARDINA, Francesco (LNS); PLUMARI, Salvatore (LNS); Dr GRECO, Vincenzo (LNS)

Presenter: Dr RUGGIERI, Marco (Catania University, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **157** Type: **Oral presentation**

Toward a solution of the RAA and v2 puzzle for heavy quarks.

Thursday, June 25, 2015 3:20 PM (20 minutes)

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One of the primary aims of the ongoing nuclear collisions
at Relativistic Heavy Ion Collider (RHIC) and Large Hadron
Collider (LHC) energies is to create a Quark Gluon Plasma (QGP).
The heavy quarks, charm and bottom constitutes a unique probe of the QGP properties.
Both at RHIC and LHC energies a puzzling relation between the nuclear modification factor
RAA(pT) and the elliptic flow v2(pT) related to heavy quark has been observed which challenged all the existing models.
We discuss how the temperature dependence of the heavy quark
drag coefficient is responsible to address for a large part of such a puzzle. In particular, we have considered four different models to
evaluate the temperature dependence of drag and diffusion coefficients propagating through a quark
gluon plasma (QGP). All the four different models are set to reproduce the same
RAA(pT) observed in experiments at RHIC and LHC energy. We point out that for the same RAA(pT) one can generate
2-3 times more v2 depending on the temperature dependence of the heavy quark drag coefficient.
An increasing drag coefficient as Tc is a major ingredient for a simultaneous description of RAA(pT) and v2(pT).

Primary authors: SCARDINA, Francesco (INFN-LNS, Catania, Italy); Dr DAS, Santosh Kumar (University of Catania & LNS-INFN, Italy); Dr GRECO, Vincenzo (LNS)

Presenter: SCARDINA, Francesco (INFN-LNS, Catania, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **158** Type: **Oral presentation**

The Trojan Horse Method as a tool for investigating astrophysically relevant fusion reactions

Thursday, June 25, 2015 4:25 PM (20 minutes)

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In the framework of stellar nucleosynthesis and models, the combined study of the light elements (i.e. lithium, beryllium and boron) abundances in stellar atmospheres gives an unique opportunity for understanding stellar structure because of their different fragility against (p,alpha) reactions. This implies different stellar depths at which they are gradually destroyed, thus the residual atmospheric abundances will reflect the effect of plasma mixing. Being these reactions ignited at temperatures of few millions of Kelvin, experimental nuclear astrophysics has to use often extrapolation
procedures to access the relevant Gamow energy peak. Thus, the developments
of indirect techniques allowed the experimentalist to by pass such difficulties and, among them, the Trojan Horse Method (THM) has been largely applied for measuring the bare nucleus S(E)-factor
for astrophysically relevant reactions, without experiencing both Coulomb penetrability and electron
screening effects. THM allows one to extract the bare-nucleus cross-section of a charged-particle induced
reaction a(x,c)C at astrophysical energies free of Coulomb suppression, by properly selecting
the quasi-free (QF) contribution of an appropriate reaction a(A,cC)s, performed at energies well above the Coulomb barrier. Here, the nucleus A has a dominant x-s cluster configuration, thus representing the so-called "TH-nucleus".
Here, in view of the recent TH measurements, the main destruction channel for the two lithium (6Li and 7Li) and boron (11B and 10B) will be discussed, giving large emphasis to their impact on astrophysical scenarios and to their measurement for probing electron screening effects.

Primary author: LAMIA, Livio (INFN-LNS, Catania, Italy)

Co-authors: Dr TUMINO, Aurora (LNS); SPITALERI, Claudio (LNS); LA COGNATA, MARCO SALVATORE (LNS); SERGI, Maria Letizia (LNS); PIZZONE, Rosario (LNS); ROMANO, Stefano (LNS); PUGLIA, nelly (università di Catania)

Presenter: LAMIA, Livio (INFN-LNS, Catania, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **159** Type: **Oral presentation**

Quark coalescence from RHIC to LHC

Monday, June 22, 2015 4:40 PM (20 minutes)

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{\large \bf Quark coalescence from RHIC to LHC}
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\begin{center}
% insert the authors here. The presenter is underlined
\underline{V.Minissale}[1,2], F.Scardina[1,2], V.Greco[1,2]
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] Department of Physics and Astronomy, University of Catania, Via S. Sofia 62,
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{\em [2] INFN-LNS,Laboratori Nazionali del Sud, Via S. Sofia 64,I-95123, Catania, Italy}\\
\end{center}

% write your abstract here
We discuss the application of a phase-space coalescence plus fragmentation model for the hadronization of the quark-gluon plasma (QGP) created in ultra-relativistic heavy-ion collisions. Recombination of minijet partons with the partons from the QGP is also included and plays a role at $p_T \sim 2-4$ GeV where the baryon to meson anomaly is observed experimentally. \\ We show our prediction for light and strange hadrons transverse momentum spectra (π, \textit{p}, \textit{k}, Λ, ϕ, Ω) and baryon to meson ratios (\textit{p}/π, Λ/\textit{k}, Ω/ϕ) in a wide range of p_T, both for

RHIC and LHC energies. The baryon to meson ratio at LHC presents similar features of that at RHIC, but with a shift in the peak of about 0.5 GeV, and this is well predicted by our model.

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\end{document}

Primary author: MINISSALE, Vincenzo (University of Catania / INFN-LNS, Italy)

Presenter: MINISSALE, Vincenzo (University of Catania / INFN-LNS, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **160** Type: **Poster**

Lambda Polarization in Energetic Peripheral Heavy Ion Collisions

Primary author: Prof. LASZLO PAL, Csernai (University of Bergen)

Co-authors: Mr WANG, Dujuan (University of Bergen); Prof. BECATTINI, Francesco (University of Florence and INFN Florence); Dr XIE, Yilong (University of Bergen)

Presenter: Dr XIE, Yilong (University of Bergen)

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **162** Type: **Oral presentation**

AGB star nucleosynthsis: when new data from nuclear physics help to solve puzzles

Tuesday, June 23, 2015 6:10 PM (20 minutes)

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Word , <a href=”https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235”>Lat

Low mass stars contribute to the chemical evolution of the Galaxy as well as more massive supernova progenitors. Indeed the limited amount of processed matter released into the interstellar medium by small objects is compensated by the large number of them.
At the late stages of their evolution, stars with mass smaller than 3Mo undergo the Asymptotic Giant Branch (AGB) phase, which has been found to be a unique site for synthesis of some nuclei heavier than Fe trough slow neutron capture reactions. AGB nucleosynthesis is also characterized by H-burning coupled with mixing phenomena, which have been proved to account for anomalies in the Li abundance and C, N and O isotopic ratio observed in stellar spectra and meteorite grains.
Nowadays the improvements in stellar spectroscopy and the growing number of geochemical analysis of meteorite grains offer new challenges and stronger constraints for the model of stellar nucleosynthesis and a high precision of the nuclear physics data employed in calculations is required.
We present how updated measurements of nuclear cross sections contribute to solve puzzles of oxygen isotopic mix in presolar grains of AGB origins. While despite accurate measurement of the reaction rate the high abundances of 26Al found in the same grains require a specific mixing model to be reproduced, similar to the one needed to trigger the formation of an extended neutron source in low mass AGB stars.
Finally, to show the crucial role of a proper estimation of electron density at the nucleus in the stellar plasma we present an evaluation of the complex problem of Li abundances in AGB stars in the light of an ad-hoc estimate of the 7Be time-of-life.

Primary author: Dr PALMERINI, Sara (INFN - LNS, Catania, Italy)

Presenter: Dr PALMERINI, Sara (INFN - LNS, Catania, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **163** Type: **Invited Talk - Parallel Session**

The nuclear matrix elements of neutrino-less double beta decay decay and the NUMEN project at INFN-LNS

Thursday, June 25, 2015 5:50 PM (25 minutes)

Primary author: CAPPUZZELLO, Francesco (INFN-LNS, Catania, Italy)

Presenter: CAPPUZZELLO, Francesco (INFN-LNS, Catania, Italy)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **164** Type: **Oral presentation**

Recent experiments in inverse kinematics with the magnetic spectrometer PRISMA

Monday, June 22, 2015 4:55 PM (20 minutes)

Primary author: Dr FIORETTO, Enrico (INFN - Laboratori Nazionali di Legnaro)

Presenter: FIORETTO, Enrico (INFN-LNL, Legnaro, Italy)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **165** Type: **Oral presentation**

First experimental indication of the Giant Pairing Vibration in the 14C and 15C nuclei

Monday, June 22, 2015 5:00 PM (20 minutes)

Primary author: Dr CARBONE, Diana (INFN-LNS, Catania, Italy)

Presenter: Dr CARBONE, Diana (INFN-LNS, Catania, Italy)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **166** Type: **Oral presentation**

Properties of Excited A = 40 Nuclear Systems With Varying Matter Composition

Thursday, June 25, 2015 3:40 PM (20 minutes)

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Word , <a href="https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235">Lat**

Properties of Excited A = 40 Nuclear Systems With Varying Matter Composition

When two alpha-conjugate nuclei collide bosonic properties might control important features of the reaction dynamics and the evolution of the excited system.
In an analysis of 40Ca + 40Ca reactions at 35Mev/A we selected classes of projectile-like sources with exit channels consisting of only bosons, only fermions, only even-even nuclei, only odd - odd nuclei, only even - odd nuclei and only alpha-conjugate nuclei, respectively and searched for kinematic characteristics of these systems which might differ depending upon the type of matter selected. The distributions of various observables for the different classes of matter and comparisons between them will be presented and discussed.

Primary author: Dr SCHMIDT, Katarzyna (University of Silesia, Katowice, Poland)

Presenter: Dr SCHMIDT, Katarzyna (University of Silesia, Katowice, Poland)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **167** Type: **Oral presentation**

Production cross section measurement and identification of new isotopes in the vicinity of 100Sn

Monday, June 22, 2015 4:45 PM (20 minutes)

Primary author: Dr CELIKOVIC, Igor (Institute of Nuclear sciences "Vinca", Belgrade, Serbia)

Co-authors: Dr JUNGCLAUS, Andrea (Instituto de Estructura de la Materia, CSIC); Dr BLAZHEV, Andrey (University of Cologne); Dr BLANK, Bertram (CEN Bordeaux-Gradignan); LUBOS, Daniel (TU Munich); Dr BROWNE, Frank (Brighton Univ./IPA); Dr KIM GI DONG, Gi Dong (Institute for Basic Science); Dr DE FRANCE, Gilles (GANIL); Dr LORUSSO, Giuseppe (RIKEN); Dr SCHAFFNER, Henning (GSI); Dr BABA, Hidetada (RIKEN); Dr WATANABE, Hiroshi (Beihang University); Dr SAKURAI, Hiroyoshi (University of Tokyo); Dr NISHIZUKA, Ippei (Tohoku University); Dr KOJOUHAROV, Ivan (GSI); PARK, Jason (TRIUMF/UBC); Dr WU, Jin (Peking University); Dr GIOVINAZZO, Jérôme (CEN Bordeaux-Gradignan); Dr MOSCHNER, Kevin (University of Cologne); Dr STEIGER, Konrad (TU Munich); Dr SINCLAIR, Laura (York Univ./IPA); Dr GORSKA, Magdalena (GSI Darmstadt); Dr LEWITOWICZ, Marek (GANIL, France); Dr RAJABALI, Mustafa (TRIUMF); Ms GOEL, Namita (GSI); Dr KURZ, Nick (GSI); Dr DOORNENBAL, Pieter (RIKEN); Dr BOUTACHKOV, Plamen (TU/GSI Darmstadt); Mr SÖDERSTRÖM, Pär-Anders (Uppsala University); Prof. KRUECKEN, Reiner (TRIUMF); Dr GERNHÄUSER, Roman (TU-Munich); Dr NISHIMURA, Shunji (RIKEN Nishina Center (RNC)); Dr RICE, Simon (Surrey Univ./IPA); Dr ILIEVA, Stoyanka (TU Darmstadt); Dr ISOBE, Tada-aki (RIKEN); Dr FAESTERMANN, Thomas (TU-Munich); Dr SUMIKAMA, Toshiyuki (Tohoku University); Dr FANG, Yifan (Osaka University); Dr KIM, Yong-Kyun (Institute for Basic Science); Dr PATEL, Zena (Surrey Univ./IPA); Dr XU, Zhengyu (University of Tokyo); Dr WANG, Zhimin (TRIUMF)

Presenters: Dr CELIKOVIC, Igor (Institute of Nuclear sciences "Vinca", Belgrade, Serbia); Dr LEWITOWICZ, Marek (GANIL, France)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **168** Type: **Invited Talk - Parallel Session**

Self-consistent description of deformed proton drip-line nuclei

Thursday, June 25, 2015 5:25 PM (25 minutes)

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Lidia S. Ferreira1, Enrico Maglione2 and Peter Ring3
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3Physik-Department der Technischen Universitat Munchen, D-85748 Garching, Germany l
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Covariant density functional theory (CDFT) has provided a framework to develop successful microscopic descriptions of nuclear structure[1]. An important feature of these relativistic mean-field
approaches, relies on the fact of requiring only a small number of parameters adjusted to reproduce bulk properties of finite nuclei since they are derived from Lorentz invariant density functionals that consistently connect the spin and spatial degrees of freedom in the nucleus. They are valid over the entire periodic table, and have successfully been able to describe ground state properties in finite spherical and deformed nuclei over the entire nuclear chart, from light nuclei to super-heavy elements, and from the neutron drip line where halo phenomena are observed to the proton drip line. Single particle configurations and spectroscopic factors have also been successfully derived for nuclei at the limits of stability.
Applications to exotic decays have also been presented [2]. Fully self-consistent relativistic description of proton emission from spherical nuclei, based on relativistic density functionals derived from meson exchange and point coupling models, reproduced well the experimental data and could identify the existence of correlations and configuration mixing effects.
We have generalize our model, and performed a fully relativistic self-consistent calculation to describe decay from deformed nuclei. The proton wave function was obtained exactly from the solution of the Dirac equation in a deformed mean field, with outgoing wave boundary condition, therefore, with the correct asymptotic behaviour. The experimental data was reproduced, and the nuclear structure properties of the emitter identified.
In this work, the theoretical procedure will be presented, and the comparison with the data discussed.

1. D. Vretenar, A. V. Afanasjev, G. A. Lalazissis, and P. Ring, Phys. Rep. 409 (2005) 101.
2. L. S. Ferreira, E. Maglione, and P. Ring, Phys. Lett. B 701 (2011) 508.

Primary authors: Prof. MAGLIONE, Enrico (Dep Fisica, Univ Padova); Prof. FERREIRA, Lidia S. (CeFEMA, Dep Fisica, IST, Univ Lisboa, Portugal); Prof. RING, Peter (Dep Fisica, Univ Munchen)

Presenter: Prof. FERREIRA, Lidia S. (CeFEMA, Dep Fisica, IST, Univ Lisboa, Portugal)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **169** Type: **Poster**

Coulomb penetration and nuclear transmutations at sub-barrier reactions

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Many features of stellar evolution are mostly determined by nuclear reactions below the Coulomb barrier. Barrier penetrability and nuclear virtual process give main components of such reactions. The Trojan Horse Method [1,2] represents a useful framework for experimental test of the nuclear virtual reaction. Making use of such an approach we reveal deeply sub-barrier (p,x) reaction cross sections from quasi-free (d,nx) reaction data. Coulomb barrier penetration coefficient is calculated while taking into account the finiteness of nuclear potential of various shapes. In this contribution we analyze these components for nuclear processes important for Li/Be/B abundances, cf. [3,4] and refs. therein.

Primary author: Prof. KONDRATYEV, Vladimir (National Taras Shevchenko University of Kyiv)

Co-authors: SPITALERI, Claudio (LNS); Mr KRES, Ievgenyi (National Taras Shevchenko University of Kyiv); Prof. KADENKO, Ihor (National Taras Shevchenko University of Kyiv); CHERUBINI, Silvio (LNS)

Presenters: CHERUBINI, Silvio (LNS); Prof. KONDRATYEV, Vladimir (National Taras Shevchenko University of Kyiv)

Track Classification: Nuclear Astrophysics

Contribution ID: **170** Type: **Poster**

Statistics of magnetar crusts magnetoemission

Primary author: Prof. KONDRATYEV, Vladimir (National Taras Shevchenko University of Kyiv)

Co-author: Prof. KOROVINA, Yuliia (Moscow Institute of Open Education, Russia)

Presenters: Prof. KONDRATYEV, Vladimir (National Taras Shevchenko University of Kyiv); Prof. KOROVINA, Yuliia (Moscow Institute of Open Education, Russia)

Track Classification: Nuclear Astrophysics

Contribution ID: **171** Type: **Oral presentation**

Interplay between proton-neutron pairing and deformation in N=Z medium mass nuclei

Monday, June 22, 2015 4:40 PM (20 minutes)

Primary author: GAMBACURTA, Danilo (INFN-Sezione di Catania, Italy)

Co-author: Dr LACROIX, Denis (IPN Orsay)

Presenter: GAMBACURTA, Danilo (INFN-Sezione di Catania, Italy)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **172** Type: **Invited Talk - Parallel Session**

Scattering process for the system ^{7}Be+^{208}Pb at near-barrier energies

Tuesday, June 23, 2015 2:55 PM (25 minutes)

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\begin{document}
\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

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\begin{center}
{\large \bf Scattering process for the system ^{7}Be+^{208}Pb at near-barrier energies}
\end{center}

\begin{center}
\underline{M.~Mazzocco}[1,2], C.~Stefanini[1,2], A.~Boiano[3], C.~Boiano[4],
M.~La~Commara[3,5], C.~Manea[2], C.~Parascandolo[3], D.~Pierroutsakou[3],
C.~Signorini[6], F.~Soramel[1,2], E.~Strano[1,2], D.~Torresi[1,2],
L.~Acosta[7], P.~Di~Meo[3], J.P.~Fernandez-Garcia[8], J.~Grebosz[9],
G.~Marquinez-Duran[7], I.~Martel[7], M.~Nicoletto[2], A.~Pakou[10], T.~Sava[11],
O.~Sgouros[10], V.~Soukeras[10], L.~Stroe[11], N.~Toniolo[6]
\end{center}

\begin{center}
{\em [1] Dipartimento di Fisica e Astronomia, Universit\'a di Padova, Padova, Italy} \\
{\em [2] INFN-Sezione di Padova, Padova, Italy}\\
{\em [3] INFN-Sezione di Napoli, Napoli, Italy}\\
{\em [4] INFN-Sezione di Milano, Milano, Italy}\\
{\em [5] Dipartimento di Fisica, Universit\'a di Napoli 'Federico II", Napoli, Italy}\\
{\em [6] INFN-Laboratori Nazionali di Legnaro (LNL), Legnaro (PD), Italy}\\
{\em [7] Departamento de F\isica Aplicada, Universidad de Huelva, Huelva, Spain}\\
{\em [8] INFN-Laboratori Nazionali del Sud (LNS), Catania, Italy}\\
{\em [9] HINP and Department of Physics, University of Ioannina, Ioannina, Greece}\\
{\em [10] Institute of Nuclear Physics of the Polish Academy of Science (IFJ PAN), Krakow, Poland}\\

{\em [11] National Institute for Physics and Nuclear Engineering (NIPNE), Magurele, Romania}\\
\end{center}

We investigated for the first time the reaction dynamics induced by the
weakly-bound projectile ^{7}Be (S_α = 1.584 MeV) on a ^{208}Pb target
at three near-barrier energies, namely 37.6, 40.5 and 42.4 MeV.
The ^{7}Be Radioactive Ion Beam was produced with an intensity about
2.5×10^5 pps by means of the facility EXOTIC [1] at INFN-LNL (Italy).
Charged reaction products were detected in the angular range θ_{cm}
= [55°,165°] with the telescope array EXPADES [2].

Fig. 1 shows the preliminary evaluation of the elastic scattering angular
distributions together with the results of the optical model analysis.
Fig. 2 presents the reduced reaction cross sections for the
systems ^{6,7}Li,^{7}Be + ^{208}Pb [3]. Quite unexpectedly, the ^{7}Be reaction
cross section data follow the trend individuated by those measured for the reaction
induced by the more tightly-bound mirror nucleus ^{7}Li (S_α = 2.468 MeV)
rather than those obtained for the similarly weakly-bound projectile
^{6}Li (S_α = 1.475 MeV).

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\caption{Elastic scattering angular distributions for the system ^{7}Be + ^{208}Pb.}
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\caption{Reduced reaction cross sections for the systems ^{6,7}Li,^{7}Be + ^{208}Pb.}
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[1] F. Farinon \emph{et al.}, Nucl. Instr. Meth. B {\bf 266}, 4097 (2008).
[2] E. Strano \emph{et al.}, Nucl. Instr. Meth. B {\bf 317}, 657 (2013).
[3] N. Keeley \emph{et al.}, Nucl. Phys. A {\bf 571}, 326 (1994).
\end{document}

Primary author: MAZZOCCO, Marco (University of Padova, Italy)

Co-authors: Prof. PAKOU, ATHENA (UNIVERSITY OF IOANNINA); BOIANO, Alfonso (NA); MANEA, Christian (PD); BOIANO, Ciro (MI); Mr STEFANINI, Claudio (University of Padova); PARASCANDOLO, Concetta (NA); SIGNORINI, Cosimo (LNL); PIERROUTSAKOU, Dimitra (NA); TORRESI, Domenico (LNS); STRANO, Emanuele (PD); SORAMEL, Francesca (PD); MARQUÍNEZ-DURÁN, Gloria (University of Huelva); Prof. MARTEL, Ismael (Universidad de Huelva); Dr GREBOSZ, Jerzy (IFJ PAN

Cracow, Poland); FERNANDEZ GARCIA, Juan Pablo (LNS); ACOSTA SANCHEZ, LUIS ARMANDO (C); Dr STROE, Lucian (NIPNE); LA COMMARA, Marco (NA); NICOLETTO, Marino (PD); TONIOLO, Nicola (LNL); Mr SGOUROS, Onofious (University of Ioannina); DI MEO, Paolo (NA); Dr SAVA, Tiberiu (NIPNE); Mr SOUKERAS, Vassileios (University of Ioannina)

Presenter: MAZZOCCO, Marco (University of Padova, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **173** Type: **Oral presentation**

Nuclear Reactions on Copper Induced by Cosmic Protons

Tuesday, June 23, 2015 4:25 PM (20 minutes)

Primary author: Dr CHUVILSKAYA, Tatjana (SINP MSU, Moscow, Russia)

Presenter: Dr CHUVILSKAYA, Tatjana (SINP MSU, Moscow, Russia)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **174** Type: **Oral presentation**

Fusion measurements of 12C+12C at energies of astrophysical interest

Thursday, June 25, 2015 3:45 PM (20 minutes)

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The cross section of the ^{12}C+^{12}C fusion reaction at low energies is of paramount importance for models of stellar nucleosynthesis in different astrophysical scenarios, such as Type Ia supernovae and X-ray superbursts, in which this reaction is a primary route for the production of heavier elements. In a series of experiments performed at Argonne National Laboratory using Gammasphere and an array of silicon detectors, measurements of the fusion cross section of ^{12}C+^{12}C were successfully carried out in the center-of-mass energy range of 3-5 MeV using the γ and charged-particle coincidence technique. These were the first background-free fusion cross section measurements for ^{12}C+^{12}C at low energies. Our results are consistent with previous measurements in the high-energy region; however, our lowest energy measurement indicates a fusion cross section slightly lower than those obtained with other techniques. Results will be presented and the physical implications of extrapolations of the fusion hindrance model and other theoretical calculations will be discussed.

This material is based upon work supported by the U.S. Department of Energy, Office of Nuclear Physics, under contract No. DE-AC02-06CH11357 and U.S. Department of Energy grant No. DE-FG02-96ER40978. This research used resources of ANL’s ATLAS facility, which is a DOE Office of Science User Facility.

Primary authors: JIANG, C. L. (ANL); SANTIAGO-GONZALEZ, Daniel (LSU, ANL, USA)

Presenter: SANTIAGO-GONZALEZ, Daniel (LSU, ANL, USA)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **175** Type: **Oral presentation**

Exploring clustering in alpha-conjugate nuclei using the thick target inverse kinematic technique for multiple alpha emission

Tuesday, June 23, 2015 4:00 PM (20 minutes)

Primary author: Dr BARBUI, Marina (Cyclotron Institute, TAMU, USA)

Presenter: Dr BARBUI, Marina (Cyclotron Institute, TAMU, USA)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **176** Type: **Oral presentation**

Study of the ^{20,22}Ne + ^{20,22}Ne and ^{10,12,13,14,15}C + ^{12}C fusion reactions with MUSIC

Tuesday, June 23, 2015 6:25 PM (20 minutes)

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Fusion cross sections measurements play an important role for both nuclear structure and nuclear astrophysics. For example,
fusion reactions between light neutron-rich nuclei have been proposed to be a possible energy source in X-ray superbursts
that originate in the crust of an accreting neutron star.
Experimental fusion reaction studies are essential to test the predictive power of the theoretical models for the fusion
reactions that are included in calculations of superbursts.
The development of the MUlti-Sampling Ionization Chamber (MUSIC) detector has opened new possibilities for fusion reaction
studies. The high efficiency and flexibility to measure the excitation function of fusion reactions in a large energy range
in a single measurement make the MUSIC detector an ideal tool for performing measurements of fusion cross sections
with radioactive beams.
A systematic study of the excitation function of the ^{20,22}Ne + ^{20,22}Ne and ^{10,12,13,14,15}C + ^{12}C systems using the MUSIC detector
has been performed at ATLAS. The experimentally extracted excitation functions and comparison with
theoretical predictions will be presented.

This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics,
under contract number DE-AC02-06CH11357. This research used resources of ANL's ATLAS facility, which is a DOE Office of
Science User Facility.

Primary authors: Dr REHM, E. K. (Physics Division, Argonne National Laboratory, Argonne IL 60439, USA); Dr AVILA, Melina (Physics Division, Argonne National Laboratory, Argonne IL, USA)

Presenter: Dr AVILA, Melina (Physics Division, Argonne National Laboratory, Argonne IL, USA)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **177** Type: **Oral presentation**

From Femtonova to Supernova: Heavy Ion Collisions and the Supernova Equation of State

Tuesday, June 23, 2015 3:40 PM (20 minutes)

Primary author: Dr HAGEL, Kris (Cyclotron Institute, Texas A & M University, USA)

Co-authors: Dr ROEPKE, G. (University of Rostock, FB Physik, Rostock, Germany); Dr NATOWITZ, J. B. (Cyclotron Institute, Texas A & M University); Dr SCHMIDT, K. (Institute of Physics, Silesia University, Katowice, Poland); Dr BARBUI, M. (Cyclotron Institute, Texas A & M University); Dr HEMPEL, M. (Department of Physics, University of Basel, 4056 Basel, Switzerland); Dr WADA, R. (Institute of Modern Physics HIRFL, Chinese Academy of Sciences, Lanzhou, 730000, China); Dr TYPEL, S. (GSI Helmholtzzentrum für Schwerionenforschung GmbH, D-64291 Darmstadt, Germany); Dr WUENSCHEL, S. (Cyclotron Institute, Texas A & M University)

Presenter: Dr HAGEL, Kris (Cyclotron Institute, Texas A & M University, USA)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **178** Type: **Oral presentation**

CALIFA: The R3B CALorimeter for In Flight detection of g-rays and high energy charged pArticles

Thursday, June 25, 2015 6:35 PM (20 minutes)

Primary author: Dr CORTINA-GIL, Dolores (Universidad Santiago Compostela, Spain)

Presenter: Dr CORTINA-GIL, Dolores (Universidad Santiago Compostela, Spain)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **179** Type: **Oral presentation**

Effect of breakup channel on other reaction mechanisms of the 8B + 208Pb system at near barrier energies

Tuesday, June 23, 2015 6:30 PM (20 minutes)

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In the present work we study the effect of the breakup channel of the proton halo on the other reaction mechanism for the system involving the projectile 8B and a heavy target 208PB. It is found in the literature that the breakup of neutron-halo projectile damp the elastic scattering angular distributions, especially at angles near the Coulomb − nuclear interference peak. Strong damp was found for the 11Li + 208Pb [1] system due to E1 excitation of the projectile to the continuum states. Some damp was also observed for other systems for reactions involving the 6He neutron halo projectile [2 - 4], due to Coulomb-nuclear breakup interference. Recently Y.Y. Yang et al. [5] measured the elastic scattering angular distribution for the 8B + 208Pb system at about three times the Coulomb barrier. They found almost no influence of the breakup channel on the elastic scattering at this high energy. Recent work [6] shows that the breakup of the 8B projectile almost does not affect the elastic scattering angular distribution of its interaction with 58Ni. In the present work we show that in the case of the interaction of 8B with heavy target, a damp of the elastic scattering is observed too, mainly dominated by the Coulomb breakup, with a very weak influence of the nuclear breakup. It is observed a contribution of the dipole and quadrupole interactions of the same orders. A strong dependence on the binding energy of 8B is observed in our conclusions. A detail study of the reaction mechanism is performed for the 8B + 208Pb system at near barrier energies.

[1] J. P. Fernández-García, et al. Phys. Rev. Lett. 110 (2013) 142701.
[2] A. Di Pietro, et al., Phys. Rev. C 69, 044613 (2004).
[3] N. Keeley, N. Alamanos, K.W. Kemper, and K. Rusek, Phys. Rev. C 82, 034606 (2010).
[4] A. Di Pietro, et al., Phys. Rev. C 85, 054607(2012).
[5] Y.Y. Yang, et.al., Phys. Rev. C 87, 044613 (2013).
[6] J. Lubian, et al., Phys. Rev. C 79, 065605 (2009).

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Presenter: Dr JESUS, Lubian (IF, UFF, Brazil)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **180** Type: **Oral presentation**

Asymmetry Dependence of the Nuclear Caloric Curve

Thursday, June 25, 2015 3:20 PM (20 minutes)

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My recent measurements have demonstrated a dependence of the caloric curve on the neutron-proton asymmetry. If confirmed, this represents a new feature of the nuclear equation of state. These results were made possible by the complete isotopic reconstruction of excited quasi-projectiles produced in heavy ion collisions. I will discuss the isotopic reconstruction and multiple probes of the the temperature, which are the strengths of this measurement. I will address the uncertainty which arises from the neutron measurement. I will present the status of an independent experiment designed to measure the caloric curve in a way that completely eliminates the previous uncertainties and will allow us to confirm or deny our initial discovery.

Primary author: Dr MCINTOSH, Alan (Texas A&M Univeristy, USA)

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Presenter: Dr MCINTOSH, Alan (Texas A&M Univeristy, USA)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **181** Type: **Invited Talk - Parallel Session**

Studying astrophysical reactions with low-energy RI beams at CRIB

Thursday, June 25, 2015 2:55 PM (25 minutes)

Primary author: Dr YAMAGUCHI, Hidetoshi (Center for Nuclear Study, University of Tokyo, Japan)

Co-authors: SPITALERI, Claudio (LNS); Mr KAHL, Daid (The University of Tokyo); Dr HAYAKAWA, Seiya (Center for Nuclear Study, University of Tokyo); CHERUBINI, Silvio (LNS); Mr SAKAGUCHI, Yuji (The University of Tokyo)

Presenter: Dr YAMAGUCHI, Hidetoshi (Center for Nuclear Study, University of Tokyo, Japan)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **182** Type: **Oral presentation**

Using CHIMERA detector at LNS for gamma-particle coincidences

Thursday, June 25, 2015 2:55 PM (20 minutes)

Primary author: CARDELLA, Giuseppe (INFN-Sezione di Catania, Italy)

Presenter: CARDELLA, Giuseppe (INFN-Sezione di Catania, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **183** Type: **Invited Talk - Parallel Session**

The infuence of the 2-neutron elastic transfer on the fusion of 42Ca + 40Ca

Thursday, June 25, 2015 5:25 PM (25 minutes)

Primary author: STEFANINI, Alberto (INFN-LNL. Legnaro, Padova, Italy)

Presenter: STEFANINI, Alberto (INFN-LNL. Legnaro, Padova, Italy)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **184** Type: **Oral presentation**

Dynamical Dipole Mode in the 40,48Ca+152,144Sm fusion-evaporation and fission reactions at 11 MeV/nucleon

Tuesday, June 23, 2015 3:15 PM (20 minutes)

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The Dynamical Dipole mode (DD) is a large amplitude collective oscillation of protons against neutrons of the dinucleus formed in charge asymmetric heavy-ion collisions [1-4]. The study of its gamma decay gives us
valuable information on the reaction dynamics and could shed light on the density dependence of the symmetry energy in the nuclear matter Equation of State at sub-saturation densities [5]. Furthermore, being a pre-equilibrium phenomenon, the DD ⊠ decay could be an interesting cooling mechanism of the
composite system in the fusion path, to facilitate super-heavy element formation. In this framework, we investigated the DD excitation and subsequent gamma decay in the mass region of the 192Pb composite system
formed in the fusion-evaporation and fission 40Ca + 152Sm and 48Ca +144Sm reactions at Elab = 440 MeV and 485 MeV, respectively. The experiment was performed at Laboratori Nazionali del Sud, Italy. The gamma-rays
and the light charged particles emitted in the reaction were detected by using the MEDEA apparatus [6] while the heavy reaction fragments were detected by position sensitive Parallel Plate Avalanche Counters
placed symmetrically around the beam direction. The analysis of the gamma-ray spectra and angular distributions evidenced in a model independent way the DD excitation in such a heavy composite system in both exit channels: fusion-evaporation and fission. The possible implications of observing DD gamma radiation in the evaporation channel of a heavy composite system in the super-heavy element quest will be discussed. On the other hand, the observation of DD gamma radiation also in the fission exit channel (never observed before) provides inedited information on the DD excitation at higher partial waves, setting thus new severe constraints on theoretical models.

[1] S. Flibotte et al., PRC77 (1996)1448
[2] F. Amorini et al., PRC69 (2004) 014608
[3] D. Pierroutsakou et al., PRC71 (2005)054605, PRC80(2009)024612, B. Martin et al., PLB664 (2008)47
[4] A. Corsi et al., PLB679 (2008)197, A. Giaz PRC90 (2014) 014609
[5] V. Baran et al., PRC79 (2009)021603(R)
[6] E. Migneco et al., NIMA314 (1992)31

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Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **185** Type: **Invited Talk - Parallel Session**

Nuclear symmetry energy in density-dependent relativistic Hartree-Fock theory: the role of Fock terms and tensor force

Thursday, June 25, 2015 5:50 PM (25 minutes)

Primary author: Dr SUN, Bao Yuan (School of Nuclear Science and Technology, Lanzhou University, China)

Co-authors: Dr JIANG, Li Juan (School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China); Mr ZHAO, Qian (School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China); Prof. LONG, Wen Hui (School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China)

Presenter: Dr SUN, Bao Yuan (School of Nuclear Science and Technology, Lanzhou University, China)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **186** Type: **Oral presentation**

Fusion reactions of 58,64Ni + 124Sn

Tuesday, June 23, 2015 6:05 PM (20 minutes)

Primary author: GALTAROSSA, Franco (INFN-LNL, Legnaro, Italy)

Presenter: GALTAROSSA, Franco (INFN-LNL, Legnaro, Italy)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **187** Type: **Oral presentation**

Sensitivity of N/Z ratio to dynamical fission of quasi-projectile in isobaric systems

Tuesday, June 23, 2015 3:20 PM (20 minutes)

Primary author: Dr DE FILIPPO, Enrico (INFN-Sezione di Catania, Italy)

Presenter: Dr DE FILIPPO, Enrico (INFN-Sezione di Catania, Italy)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **188** Type: **Oral presentation**

Sub-barrier fusion and transfers in the 40Ca+58,64Ni systems

Tuesday, June 23, 2015 2:55 PM (20 minutes)

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Fusion-evaporation is the dominant reaction mechanism in medium-light heavy-ion collisions around the Coulomb barrier (CB). At these energies and at moderate sub-barrier energies, enhancement of the fusion cross-sections was observed whereas hindrance of the fusion cross-section has been identified in many systems at deep sub-barrier energies. Fusion cross-sections around the CB have been discussed extensively to be driven by couplings of the relative motion of the colliding nuclei to their low energy surface vibrations and/or stable deformations. The corresponding coupled-channel calculations and the distributions of barriers have revealed to be a powerful tool to better understand the role of couplings to collective degrees of freedom of the target and projectile. A review on heavy-ion fusion, discussing the low-energy features has been published recently by B. Back et al. [1].

Some of the most striking results on sub-barrier fusion have been obtained in the past in the Ni+Ni [2] systems and recently in the Ca+Ca systems [3].

As regards the Ca+Ca systems, deep sub-barrier fusion cross sections have been measured in the 40Ca+40Ca, 40Ca+48Ca and 48Ca+48Ca systems at the Laboratori Nazionali di Legnaro using the Tandem accelerator Ca beams. All Ca+Ca systems have shown hindrance of the fusion cross section at the lowest energies. For the asymmetric 40Ca+48Ca, hindrance effects show up at lower energies and this was attributed to large effects of positive Qvalue neutron transfers. These results have triggered the present study of the 40Ca+58,64Ni systems. Sub-barrier fusion excitation functions of 40Ca+58Ni and 40Ca+64Ni have been measured at the Laboratori Nazionali di Legnaro using the Tandem accelerator 40Ca beam at laboratory energies ranging from ELab = 104.75 MeV to 153.5 MeV [4]. Angular distributions have been measured above and below the CB and barrier distributions have been extracted from very accurate data. Coupled channel calculations have been performed with the CCFULL code using the Akyuz and Winther nuclear potential and taking into account the projectile and target inelastic excitations of the 2 and 3- states. Positive Qvalue neutron pair transfer was also included in the calculation for the 40Ca+64Ni system for which this work represents the 1st experimental sub-barrier fusion study. Importance of the transfer channels will be discussed.

A further experimental study to be performed using the Laboratori Nazionali di Legnaro PRISMA spectrometer and aiming at measuring the transfer channels cross sections in these systems will be presented.

Primary author: Prof. COURTIN, Sandrine (IPHC Strasbourg, France)

Presenter: Prof. COURTIN, Sandrine (IPHC Strasbourg, France)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **189** Type: **Poster**

Probing dynamics of fusion reactions through cross-section and spin distribution measurement

Primary author: Dr MANINDER, Kaur (SGTB Khalsa College Anandpur Sahib, Punjab, India)

Co-author: Dr B.R., Behera (Department of Physics, Panjab University, Chandiagrh)

Presenter: Dr MANINDER, Kaur (SGTB Khalsa College Anandpur Sahib, Punjab, India)

Track Classification: Fusion and Fission

Contribution ID: **190** Type: **Poster**

Octupole bands in the neutron-rich nucleus 143Ba

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Yong-Jing Chen1, Zao-Chun Gao1, Yong-Shou Chen 1, Ya Tu2

1 China Institute of Atomic Energy, Beijing 102413, China
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The reflection asymmetric shell model (RASM) was developed to describe the high spin states in octupole deformed nuclei in Ra-Th octupole deformed nuclei [1] and neutron-rich nucleus 145Ba in Ba-Sm region[2]. In this work, RASM was performed to investigate the reflection asymmetry in 143Ba. All the observed four rotational bands are well reproduced by the present calculation with a proper octupole deformation (~ 0.08), which is consistent with the macroscopic-microscopic calculations in the literature. The two octupole deformed neutron Nilsson single-particle orbitals just below the octupole shell gap 88, with K=1/2 and K=3/2 dominate the intrinsic structure of the observed low-lying states. Based on the analysis of the calculated RASM wave functions and the pure-configuration calculation results, the assignments for the observed bands have been given. The s=+i and s=-i octupole bands are all based on the K=1/2 orbit, and they are really "parity doublets" in octupole deformed island around Z=56 and N=88. The calculated results show that the s=+i and s=-i octupole bands in 143Ba are different from the 145Ba. In 145Ba, the s=+i and s=-i octupole bands originate from the different K orbits.

[1] Y. S. Chen and Z. C. Gao, Phys. Rev. C 63, 014314 (2000).
[2] Yong-Jing Chen, Zao-Chun Gao, Yong-Shou Chen, and Ya Tu, Phys. Rev. C 91, 014317 (2015).

Primary author: Dr CHEN, Yongjing (China Institute of Atomic Energy)

Presenter: Dr CHEN, Yongjing (China Institute of Atomic Energy)

Track Classification: Nuclear Structure

Contribution ID: **191** Type: **Poster**

Examination of positive Q-value multi-neutron transfer channel couplings on fusion barrier distribution for the ^{28}Si+^{154}Sm system

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{\large \bf Examination of positive Q-value multi-neutron transfer channel couplings on fusion barrier distribution for the ^{28}Si+^{154}Sm system}
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% insert the authors here. The presenter is underlined
\underline{Gurpreet Kaur}[1,*], B.R. Behera[1], A. Jhingan[2], B.K. Nayak[3], Priya Sharma[1], Meenu Thakur[1], Ruchi Mahajan[1], R. Dubey[2], N. Saneesh[2], T. Banerjee[2], Khushboo[4], A. Kumar[1], S. Mandal[4], A. Saxena[3], P. Sugathan[2], and N. Rowley[5]
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It is well established that the interplay between nuclear structure and reaction dynamics can lead to enhancement of sub-barrier fusion cross sections, when compared with single-barrier predictions [1]. However, the role of neutron transfer in heavy-ion fusion is still not well understood. Systems like ^{40}Ca + ^{124,132}Sn [2], and ^{28}Si + ^{124}Sn [3] show effects on the enhancement, and on the related barrier distributions, due to the presence of positive Q-value neutron-transfer channels. But fusion in systems such as ^{58,64}Ni + ^{124,132}Sn, despite the presence of positive Q-value channels, do not show such a correlation [4]. Recently, it has been reported that couplings to positive Q-value neutron transfer channels are important if they lead to a change in the deformation of the colliding nuclei [5]. However, most of the systems studied involved spherical nuclei where the couplings take place to surface vibrations. It is, therefore, of interest to look for possible transfer effects in the presence of a static deformation of the target and/or projectile.

Moreover, the fusion barrier distribution (BD) has been shown to permit deeper insight into fusion dynamics than the cross section itself. With the above motivation in mind, a quasi-elastic BD measurement has been carried out for the ^{28}Si+^{154}Sm system, whose target possesses a large static deformation. Precise quasi-elastic cross sections were measured for this system at large backward angles using the HYTAR (HYbrid Telescope ARray for quasi-elastic measurements) facility at IUAC, New Delhi and experimental BD was extracted using the method proposed by Timmers \emph{et al.} [6]. The predictions of coupled channels calculations, including the collective excitation of the target and projectile, are observed to reproduce the experimental BD rather well, indicating that the role of neutron transfer is in fact weak in this system. This observation is consistent with the earlier conclusion that the decrease in deformation parameter of residual nuclei after neutron transfer has no significant effect on fusion excitation function around Coulomb barrier energies [5]. The hexadecapole deformation of the ^{154}Sm nucleus has also been obtained from the BD analysis. Details of the experiment and coupled channel analysis will be presented during the conference.

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% A. AAAA \emph{et al.}, Phys. Rev. Lett. {\bf 1}, 1 (2015)
[1] M. Dasgupta \emph{et al.}, Annu. Rev. Nucl. Part. Sci. {\bf48}, 401 (1998).

[2] J.J. Kolata \emph{et al.}, Phys. Rev. C {\bf85}, 054603 (2012).

[3] L.S. Danu \emph{et al.}, Phys. Rev. C {\bf89}, 044607 (2014).

[4] Z. Kohley \emph{et al.}, Phys. Rev. Lett. {\bf107}, 202701 (2011).

[5] V.V. Sargsyan \emph{et al.}, Phys. Rev. C {\bf91}, 014613 (2015).

[6] H. Timmers \emph{et al.}, Nucl. Phys. A {\bf633}, 421 (1998).

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Track Classification: Fusion and Fission

Contribution ID: **192** Type: **Oral presentation**

Study of fusion-fission dynamics in ^{19}F+^{238}U reaction

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{\large \bf Study of fusion-fission dynamics in ^{19}F+^{238}U reaction}
\end{center}

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\underline
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Over the years, a large number of experiments have been performed to study the dynamics of fusion-fission mechanism in heavy ion induced reactions. These studies are important for better understanding of the reaction dynamics involved in the formation of super heavy elements in laboratory. Apart from pure fusion-fission, the existence of pre-equilibrium fission (PEQ) and

quasi-fission (QF) add further complexity to the reaction dynamics. They are found to be the competing reaction channels for light ion induced reactions with actinide targets. Though many studies have been performed in this mass region, there are still inconsistency in the results of many of these reactions. For example, the angular anisotropies of fission fragments measured in reactions ^{19}F, ^{16}O, ^{12}C + ^{232}Th, ^{238}U [1,2,3] have been found inconsistent with the statistical saddle point model (SSPM) predictions. It has been reported that PEQ fission mechanism, i.e., departure from K equilibration before fission events might be responsible for these anisotropies. However for reactions of ^{19}F, ^{16}O, ^{12}C on ^{232}Th [4], the mass distribution of fragments showed evidence of QF, i.e., no mass equilibration before fission. In the recent work, presence of QF is evident in the reaction ^{18}O+^{232}Th as compared to the ^{12}C+^{238}U system[5]. In the present work, we performed the mass distribution of fission fragments in the reaction ^{19}F+^{238}U where large anisotropy has been reported in angular distribution.

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Experiment was performed in the general purpose scattering chamber(GPSC) facility at Inter Univ
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  Mass variance of fission fragments for \protect $^{19}$F+\protect $^{238}$U reaction has been
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[1] J.C. Mein \emph{et al.},Phys. Rev. C {\bf}, 55, R995 (1997).\newline
[2] J. P. Lestone \emph{et al.}, Phys. Rev. C {\bf}, 56, R2907(1997).\newline
[3] V. S. Ramamurthy \emph{et al.}, Phys. Rev. Lett. {\bf},65, 25(1990).\newline
[4]T.K. Ghosh \emph{et al.}, Physics Letters B {\bf}, 627 (2005).\newline
[5]C.Yadav \emph{et al.}, Phys. Rev. C {\bf}, 86, 034606 (2012).\newline

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Presenter: Mr DUBEY, R (Inter University Accelerator Centre, New Delhi, India)

Track Classification: Fusion and Fission

Contribution ID: **193** Type: **Oral presentation**

Systematics for low energy incomplete fusion: still a puzzle?

Thursday, June 25, 2015 4:20 PM (20 minutes)

Primary author: Dr YADAV, Abhishek (Inter-University Accelerator Centre, New Delhi, India)

Presenter: Dr YADAV, Abhishek (Inter-University Accelerator Centre, New Delhi, India)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **194** Type: **Oral presentation**

Effect of breakup and transfer on complete and incomplete fusion in 6Li+209Bi reaction in multi-body classical molecular dynamics calculation

Tuesday, June 23, 2015 5:45 PM (20 minutes)

Primary author: Mr MORKER, Mitul R. (Veer Narmad South Gujarat University, Surat, India)

Co-author: Prof. GODRE, Subodh S. (Veer Narmad South Gujarat University, Surat, India)

Presenter: Prof. GODRE, Subodh S. (Veer Narmad South Gujarat University, Surat, India)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **195** Type: **Oral presentation**

Fission study by multi-nucleon transfer reaction at JAEA

Thursday, June 25, 2015 3:20 PM (20 minutes)

Primary author: Dr HIROSE, KENTARO (Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Japan)

Co-authors: Dr MAKII, Hiroyuki (Advanced Science Research Center, Japan Atomic Energy Agency); Dr NISHINAKA, Ichiro (Advanced Science Research Center, Japan Atomic Energy Agency); Dr SMALLCOMBE, James (Advanced Science Research Center, Japan Atomic Energy Agency); Dr NISHIO, Katsuhisa (Advanced Science Research Center, Japan Atomic Energy Agency); Dr TSUKADA, Kazuaki (Advanced Science Research Center, Japan Atomic Energy Agency); Mr TAMURA, Nobuyuki (Advanced Science Research Center, Japan Atomic Energy Agency); Dr ORLANDI, Riccardo (Advanced Science Research Center, Japan Atomic Energy Agency); Dr LEGUILLON, Romain (Advanced Science Research Center, Japan Atomic Energy Agency)

Presenter: Dr HIROSE, KENTARO (Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Japan)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **196** Type: **Oral presentation**

BCS description of weakly bound nuclei with a discretized continuum

Thursday, June 25, 2015 3:35 PM (20 minutes)

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Word , <a href="https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235">Lat

Present developments in nuclear facilities allow to study new exotic nuclei, approaching the proton and neutron driplines for both light and medium mass regions of the Segrè Chart. Nuclei close to the dripline are weakly bound and, therefore, affected by the continuum, situations where the last nucleon or nucleons are no longer bound and can explore distances far from the rest of the nucleus.

The effects of the continuum have been traditionally explored for light nuclei where the proximity of the driplines provides a rich variety of weakly bound nuclei and experimental data. In the medium mass region, several attempts for generalizing mean field approaches have been proposed with different results [1,2]. Regarding the Bardeen-Cooper-Schrieffer (BCS) approximation, the single particle continuum is first discretized and then treated normally splitting resonant and background contributions or including a continuum single particle level density [2].

In this contribution we explore the possibility of treating background and resonant parts of the continuum on the same footage. In order to do so, an average constant pairing interaction G cannot be used. General BCS equations are solved for a pairing strength that depends on the single particle wavefunctions of the neutrons forming the Cooper pair. This non-constant G is obtained integrating a residual delta interaction between the different pairs.

This procedure is applied to neutron rich oxygen isotopes. We compare the calculated experimental binding energies and two neutron separation energies with the available experimental data. We also study the spectroscopic factors for two neutron transfer reactions in this isotopic chain. The impact of the different choices for discretizing and including the continuum on these observables is discussed.

[1] PRC 53, 2809 (1996)
[2] NPA 879, 14 (2012)

Primary author: LAY VALERA, Josè Antonio (INFN - Sezione di Padova, Italy)

Co-authors: VITTURI, Andrea (PD); Prof. ALONSO, Clara E. (University of Seville); Dr FORTUNATO, Lorenzo (Dip.Fisica "G.Galilei" - università di Padova)

Presenter: LAY VALERA, Josè Antonio (INFN - Sezione di Padova, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **197** Type: **Poster**

Neutron transfer to the unbound states of 11Be and 13C

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Word , <a href="https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235">Lat**

Neutron transfer to the unbound states of 11Be and 13C
T. L. Belyaeva1, A. A Ogloblin², A. S. Demyanova², S. A.Goncharov³

1Universidad Autónoma de Estado de México, C. P. 50000, Toluca, México
2RRC Kurchatov Institute, Moscow RU-123182, Russia
3Lomonosov Moscow State University, GSP-1, Leninskie Gory, Moscow 119991, Russia

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The nucleon transfer reactions as well as the inelastic scattering data are valuable source of
We present the results of the analysis of 12C(d,p)13C (5/2 , Ex = 3.854 MeV) reaction at incide
```

Fig.1 Comparison of the differential cross sections of the 10Be(d,p)11Be reaction populated 1.785-MeV 5/2+ state calculated with the resonant (dashed line) and quasi-bound (solid line) n + 10Be wave functions.

[1] A. A. Ogloblin et al. Phys. Rev. C 84, 054601 (2011).
[2] A. A. Ogloblin et al. AIP Conf. Proceed. 1224, 100 (2010).
[3] T. L. Belyaeva et al. Phys. Rev. C 90, 064610 (2014).
[4] I. J. Thompson, Comput. Phys. Rep. 7, 167 (1988).

Primary author: Prof. BELYAEVA, Tatyana (Universidad Autónoma de Estado de México)

Co-authors: Prof. OGLOBLIN, Alexei (RRC Kurchatov Institute, Moscow RU-123182, Russia); Prof. DEMYANOVA, Alla (RRC Kurchatov Institute, Moscow RU-123182, Russia); Prof. GONCHAROV, Sergei (Lomonosov Moscow State University)

Presenter: Prof. BELYAEVA, Tatyana (Universidad Autónoma de Estado de México)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **198** Type: **Poster**

Elastic scattering of 9Be+51V near the Coulomb barrier

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The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy

`Elastic scattering of 9Be+51V near the Coulomb barrier`

J. C. Morales-Rivera1,2, E. Martínez-Quiroz2, T. L. Belyaeva1, E. F. Aguilera2, D. Lizcano2, P. Amador-Valenzuela2

1 Universidad Autónoma de Estado de México, C. P. 50000, Toluca, México
2 Departamento de Aceleradores, Instituto Nacional de Investigaciones Nucleares, Apartado Postal 18-1027, C. P. 11801, México, D. F., México

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We present the elastic scattering angular distributions of the 9Be + 51V system measured at two
 In order to check the consistency of our results with those for other systems with the same pr
```

Work partially supported by CONACYT, Mexico.

Fig.1 The reduced total reaction cross sections: the left-hand panel shows different systems with the 9Be projectile; the right-hand panel compares 9Be + 51V and 7Be + 58Ni systems.

[1] S. A. Goncharov et al., Phys. At. Nucl. 70, 1 (2007) 18.
[2] P. R. S. Gomes et al., J. Phys.: Conf. Ser. 492, 012004 (2014).

Primary author: Ms MORALES-RIVERA, Juan Carlos (Universidad Autónoma de Estado de México)

Co-authors: Dr LIZCANO, David (Departamento de Aceleradores, Instituto Nacional de Investigaciones Nucleares, Mexico); Prof. AGUILERA, Eli Francisco (Departamento de Aceleradores, Instituto Nacional de Investigaciones Nucleares, Mexico); Dr MARTÍNEZ-QUIROZ, Enrique (Departamento de Aceleradores, Instituto Nacional de Investigaciones Nucleares, Mexico); Dr AMADOR-VALENZUELA, Paulina (Departamento de Aceleradores, Instituto Nacional de Investigaciones Nucleares, Mexico); Prof. BELYAEVA, Tatyana (Universidad Autonoma del Estado de Mexico)

Presenters: Ms MORALES-RIVERA, Juan Carlos (Universidad Autónoma de Estado de México); Prof. BELYAEVA, Tatyana (Universidad Autonoma del Estado de Mexico)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **199** Type: **Poster**

The influence of atomic shell on decay properties of a nucleus

Primary author: Prof. TCHUVIL'SKY, Yury (SINP MSU)

Presenter: Prof. TCHUVIL'SKY, Yury (SINP MSU)

Track Classification: Nuclear Structure

Contribution ID: **200** Type: **Poster**

Analysis of states of light nuclei populated in reactions by 13C beam

Primary authors: Mr PREPOLEC, Lovro (Rudjer Boskovic Institute); Prof. FREER, Martin (School of Physics and Astronomy, University of Birmingham, Birmingham B15 2TT, United Kingdom); Dr SOIC, Neven (Rudjer Boskovic Institute)

Co-authors: DI PIETRO, Alessia Francesca (LNS); Dr WHELDON, Carl (University of Birmingham); MARIN-LAMBARRI, Daniel J. (School of Physics and Astronomy, University of Birmingham, Birmingham B15 2TT, United Kingdom); Mrs JELAVIC MALENICA, Desa (Rudjer Boskovic Institute, Bijenicka 54, HR-10000 Zagreb, Croatia); Dr MILJANIC, Djuro (Rudjer Boskovic Institute, Bijenicka 54, HR-10000 Zagreb, Croatia); TORRESI, Domenico (LNS); Dr GIBELIN, Julien (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France); GRASSI, Laura (PD); LATTUADA, Marcello (LNS); Mrs FISICHELLA, Maria (LNS); Prof. MILIN, Matko (Department of Physics, Faculty of Science, University of Zagreb, Bijenicka 32, HR-10000 Zagreb, Croatia); Dr UROIC, Milivoj (Rudjer Boskovic Institute, Bijenicka 54, HR-10000 Zagreb, Croatia); Mr SKUKAN, Natko (Rudjer Boskovic Institute); Dr CURTIS, Neil (School of Physics and Astronomy, University of Birmingham, Birmingham B15 2TT, United Kingdom); Dr ASHWOOD, Nick I. (/School of Physics and Astronomy, University of Birmingham, Birmingham B15 2TT, United Kingdom); FIGUERA, Pierpaolo (LNS); Mr BAILEY, Sam (School of Physics and Astronomy, University of Birmingham, Birmingham B15 2TT, United Kingdom); Dr SZILNER, Suzana (Ruder Boskovic Institute); Ms MIJATOVIC, Tea (Rudjer Boskovic Institute, Bijenicka 54, Zagreb, Croatia); Dr KOKALOVA, Tzany (University of Birmingham); Dr SCUDERI, Valentina (LNS); Mrs TOKIC, Vedrana (Rudjer Boskovic Institute); Mr JOE, Walshe (chool of Physics and Astronomy, University of Birmingham, Birmingham B15 2TT, United Kingdom)

Presenter: Mr PREPOLEC, Lovro (Rudjer Boskovic Institute)

Track Classification: Nuclear Structure

Contribution ID: **201** Type: **Poster**

Pairing induced fluctuations studied through giant dipole resonance

Primary author: Mr A.K, Rhine Kumar (Indian Institute of Technology Roorkee, India)

Co-authors: Dr PARAMASIVAN, Arumugam (Indian Institute of Technology Roorkee, India); Prof. NGUYEN DINH, Dang (RIKEN Nishina Center for Accelerator-Based Science, RIKEN 2-1 Hirosawa, Wako city, 351-0198 Saitama, Japan and Institute for Nuclear Science and Technique, Hanoi, Vietnam.)

Presenters: Dr PARAMASIVAN, Arumugam (Indian Institute of Technology Roorkee, India); Mr A.K, Rhine Kumar (Indian Institute of Technology Roorkee, India)

Track Classification: Nuclear Structure

Contribution ID: **202** Type: **Oral presentation**

Insight into the 24Mg excited states located in Gamow window for carbon - carbon burning

Thursday, June 25, 2015 5:50 PM (20 minutes)

Primary author: Dr SOIC, Neven (Rudjer Boskovic Institute, Zagreb, Croatia)

Co-author: Mrs TOKIC, Vedrana (Rudjer Boskovic Institute Zagreb Croatia)

Presenter: Dr SOIC, Neven (Rudjer Boskovic Institute, Zagreb, Croatia)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **203** Type: **Poster**

Exchange Effects in the Radiative Capture Reactions 3H(alpha,gamma)7Li and 3He(alpha,gamma)7Be at Astrophysical Low and Medium Energies

Primary author: Mr SOLOVYEV, Alexander (All-Russia Research Institute of Automatics (VNIIA))

Co-authors: Dr IGASHOV, Sergey (All-Russia Research Institute of Automatics (VNIIA)); Prof. TCHUVIL'SKY, Yury (Skobeltsyn Institute of Nuclear Physics, Moscow State University)

Presenters: Mr SOLOVYEV, Alexander (All-Russia Research Institute of Automatics (VNIIA)); Prof. TCHUVIL'SKY, Yury (Skobeltsyn Institute of Nuclear Physics, Moscow State University)

Track Classification: Nuclear Astrophysics

Contribution ID: **204** Type: **Oral presentation**

Study of two and multi particle correlations in 12C+24Mg and 12C+208Pb reactions at E/A=35 MeV

Monday, June 22, 2015 5:05 PM (20 minutes)

Primary author: Mrs QUATTROCCHI, Lucia (INFN e Università Messina)

Co-authors: Dr CHBIHI, Abdou (GANIL,CEA-IN2P3-CNRS, Caen, France); Mr PAGANO, Angelo (CT); ANZALONE, Antonino (LNS); TRIFIRO, Antonio (ME); GNOFFO, Brunilde (CT); DELL'AQUILA, Daniele (N); ROSATO, Elio (NA); PAGANO, Emanuele Vincenzo (LNS); DE FILIPPO, Enrico (CT); AMORINI, Francesca (LNS); RIZZO, Francesca (LNS); Prof. PORTO, Francesco (infn Catania); LANZALONE, Gaetano (LNS); CARDELLA, Giuseppe (CT); POLITI, Giuseppe (CT); VERDE, Giuseppe (CT); Dr LOMBARDO, Ivano (Università di Napoli Federico II and INFN - Sez. Napoli); ACOSTA SANCHEZ, LUIS ARMANDO (C); Dr FRANCALANZA, Laura (Università di Ctania e LNS catania, Italy); AUDITORE, Lucrezia (ME); VIGILANTE, Mariano (NA); TRIMARCHI, Marina (ME); Dr ISMAEL, Martel (University of Huelva); Dr VESELSKY, Martin (IoP SASc Bratislava); PAPA, Massimo (CT); RUSSOTTO, Paolo (CT); PIRRONE, Sara (CT); NORELLA, Sebastianella (ME); Dr MINNITI, triestino (INFN & Uniersità di Messina, messina, Italy)

Presenter: QUATTROCCHI, Lucia (INFN & University of Messina, Italy)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **205** Type: **Oral presentation**

Probing the Structure of the Unbound Nuclei ^{9}He and ^{10}N Through Proton Elastic Scattering

Monday, June 22, 2015 4:00 PM (20 minutes)

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The study of light nuclei at the drip lines offers a unique opportunity to test our ab-initio understanding of nuclear structure in the case of extreme proton to neutron ratios. With the advent of high-quality radioactive beams, these nuclei can now be accessed through transfer, charge exchange, or elastic scattering experiments in inverse kinematics. The very neutron-rich ^{9}He nucleus has been a subject of active research over the past decade, and many peculiarities in its structure have been claimed. We have recently performed a measurement of proton elastic scattering from ^{8}He to study the T=5/2 isobaric analog states of ^{9}He at energies near the T=2 neutron decay threshold. The quality and intensity of the ^{8}He beam at TRIUMF allowed for a high-resolution experiment with excellent statistical uncertainty, and the results of our study will be presented. At the other extreme, we have also recently performed a proton elastic scattering experiment on ^{9}C at Texas A\&M University to directly probe the structure of the proton-unbound nucleus ^{10}N. Preliminary results of this experiment will be discussed as well.

Primary author: Dr UBERSEDER, Ethan (Texas A&M University, Usa)

Co-authors: Dr DAVIDS, Barry (TRIUMF); Dr ROEDER, Brian (Texas A&M University); Dr FU, Changbo (Shanghai Jiao Tong University); Dr MELCONIAN, Dan (Texas A&M University); Dr CHUBARIAN, Greg (Texas A&M University); Dr ROGACHEV, Grigory (Texas A&M University); Ms JAYATISSA, Heshani (Texas A&M University); Mr HOOKER, Joshua (Texas A&M University); Dr ALCORTA, Martin (TRIUMF); Dr TRIBBLE, Robert (Texas A&M University); Dr GOLDBERG, Vladilen (Texas A&M University); Dr KOSHCHIY, Yevgen (Texas A&M University)

Presenter: Dr UBERSEDER, Ethan (Texas A&M University, Usa)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **206** Type: **Oral presentation**

Study of the N/Z dependence of the level density parameter with Ar+Ni reactions

Primary author: Dr ADEMARD, Guilain (IPN Orsay, France)

Co-authors: Dr BORDERIE, Bernard (IPN Orsay); Dr RIVET, Marie-France (IPN Orsay)

Presenter: Dr ADEMARD, Guilain (IPN Orsay, France)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **207** Type: **Oral presentation**

Study of Spatial Resolution and Muon Tomographic Imaging Properties of Glass RPCs

Tuesday, June 23, 2015 4:05 PM (20 minutes)

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Recent researches show that the high spatial resolution glass Resistive Plate Chambers (RPC) are very promising detectors for Muon Tomography(MT) for discriminating high-Z nuclear materials in containers or vehicles. Prototyping RPCs with LC delay-line readout method were constructed and tested. Detection efficiencies for cosmic rays of about 95% were obtained for both avalanche and streamer modes of operation. A narrow profile for avalanche signal mode is obtained, which lead to an intrinsic spatial resolution less than 1.0 mm FWHM[1]. We meanwhile report imaging results of a Muon Tomography Station prototype based on glass RPCs. Fig 1(a) shows the setup of our MT test station prototype[2]. After 24 hours of exposure, the shapes of two tested bricks ware clear and the difference of mean scattering angle can be observed in Fig. 1(b).

Primary author: Mr LI, Qite (School of Physics, Peking University, Beijing, China)

Presenter: Mr LI, Qite (School of Physics, Peking University, Beijing, China)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **208** Type: **Oral presentation**

Low-lying 1^- and 2^+ states in ^{124}Sn via inelastic scattering of ^{17}O

Tuesday, June 23, 2015 6:10 PM (20 minutes)

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\begin{document}
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\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

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{\large \bf Low-lying 1^- and 2^+ states in ^{124}Sn via inelastic scattering of ^{17}O}
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
\underline{L. Pellegri}[1,2], A. Bracco[3,4], F.C.L. Crespi[3,4] and the AGATA collaboration
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] University of the Witwatersrand, Johannesburg, South Africa} \\
{\em [2] iThemba LABS, Somerset West, South Africa} \\
{\em [3] Dipartimento di Fisica dell'Universit\'{a} degli Studi di Milano, Italy} \\
{\em [4] INFN, Sezione di Milano, Italy}\\
\end{center}

% write your abstract here
The study of the Pygmy Dipole Resonance (PDR), the low energy part of the electric dipole response in nuclei, is particularly relevant to investigate the nuclear structure and also in connection with photo-disintegration reaction rates in astrophysical scenarios. Its description, within the hydrodynamical model, corresponds to a vibration of the neutron skin against a N=Z core.

In recent years, the study of the PDR has attracted particular attention since its microscopic structure is presently under discussion. Efforts in the direction of understanding its nature require its excitation using different probes.
Indeed, recent works comparing results of photon and α scattering experiments show the presence of a different behaviour in the population of these states [1,2]. While a set of states at lower energy is excited with both types of reactions, the other set at higher energies is not populated by α scattering.
This interesting finding has motivated further work based on the use of another probe with strong isoscalar character as ^{17}O.\\ The experiment was made for the nucleus ^{124}Sn using a set up including the AGATA detector array and a system of Silicon telescopes to measure the scattered particles. With AGATA, the γ decay up to the neutron separation energy was measured with high resolution. The angular distribution was measured both for the γ rays and the scattered ^{17}O ions.
The result shows that also in the case of (^{17}O,^{17}O'γ) reaction only the low energy region is populated.
The data have been interpreted within the optical model plus DWBA (Distorted Wave Born Approximation) formalism using both the standard collective form factor and a form factor obtained by folding microscopically calculated transition densities. The DWBA calculations give a good description of the elastic scattering and of the inelastic excitation of PDR states. This allowed to extract the isoscalar component of the 1^- states. The investigation of the low-lying 2^+ states will be also presented. The DWBA calculations give a good description also of the 2^+ states.

\vspace*{0.5cm}

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% write your references here
[1] K.~Govaert et al., Phys. Rev. C 57, 2229 (1998)
[2] J.~Endres et al., Phys. Rev. Lett. 105, 212503 (2010)

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Primary author: Dr PELLEGRI, Luna (University of the Witwatersrand and iThemba LABS)

Co-authors: BRACCO, Angela (MI); Dr CRESPI, Fabio Celso Luigi (MI)

Presenter: Dr PELLEGRI, Luna (University of the Witwatersrand and iThemba LABS)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **209** Type: **Poster**

Influence of the nuclear dynamical deformation on production cross sections of superheavy nuclei

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Word , Lat

The superheavy nuclear production mechanism can be described by fusion reactions with the dinuclear system concept, in which the deformations of the two nuclei are assumed to stay at their ground state with nucleons
transferring between them. Actually the two nuclei have to deform due to very strong nuclear and Coulomb interactions between them. These deformations can be analytically described by a Fokker-Planck equation, and by combining them with a master equation that describes the nucleon transfer between nuclei the superheavy
nuclear production cross sections can be investigated systematically. The calculated results are in good agreement
with available data, and the evaporation residue cross sections for synthesizing the superheavy nuclei Z = 119 and 120 are predicted.

Primary authors: Prof. ZHANG, Hongfei (Lanzhou University); Prof. LI, Junqing (Lanzhou University)

Presenter: Prof. ZHANG, Hongfei (Lanzhou University)

Track Classification: Heavy and Superheavy Elements

Contribution ID: **210** Type: **Oral presentation**

Light flavour hadron production in the ALICE experiment at LHC

Tuesday, June 23, 2015 6:50 PM (20 minutes)

Primary author: BADALA', Angela (INFN-Sezione di Catania, Italy)

Presenter: BADALA', Angela (INFN-Sezione di Catania, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **211** Type: **Poster**

Large electron screening effect in 1H(7Li,α)4He and 1H(19F,αγ)16O reactions in different environments

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In reactions between nuclei at very low energies, when the energy of the incident beam in the center of mass system is far below the Coulomb barrier, the only way the reaction can happen is by tunneling. In this case, since the projectile has to penetrate through the huge potential barrier, the reaction rate is very low and sensitive to electronic properties of target materials. The electrons surrounding the reacting nuclei can increase the tunneling probability through the Coulomb barrier leading to an enhancement of nuclear reaction rates. Thermonuclear reactions are important in understanding the nucleosynthesis of elements in the universe and the energy generation in stars. But considering the fact that atoms in the stellar interior are in most cases in highly stripped states and nuclei are immersed in a sea of free electrons which tend to cluster closer to the nucleus than in atoms, we do not expect that the electron screening effect observed in the laboratory should be equal to electron screening in the stars. To be able to explain the electron screening in the stars, it is important that we first understand the electron screening effect under laboratory conditions.
But unfortunately, our understanding of electron screening is still poor. Even nowadays the very nature of this effect is unclear. The latest studies suggest that it is not a static, but rather a dynamic process [1]. What is known from previous experiments is that the amplitude of electron screening potential is much higher when the reaction takes place inside a metal than in an insulator or semiconductor [1-5]. Significant differences of the amplitude of the screening potential were observed between various host metals and the origin of this is not yet understood. Also, the experimental results indicate a dependence of the electron screening potential on the proton number Z of the projectile, but the form of this dependence is not known.
With the motivation to contribute to these investigations of the electron screening effect and to provide a deeper understanding of this topic, we studied the 1H(7Li,α)4He and 1H(19F,αγ)16O reactions in inverse kinematics on hydrogen implanted C, Pd, and W targets. Contrary to expectations, large electron screening potential was found in all three targets. From our results we also tried to deduce the dependence of the electron screening potential on the proton number Z of the projectile. Preliminary results show that this dependence is not linear.

[1] J. Gajević et al., Eur. Phys. J. A 49, 70 (2013).
[2] F. Raiola et al., Eur. Phys. J. A 19, 283 (2004).
[3] J. Cruz et al., Phys. Lett. B 624, 181 (2005).
[4] K. U. Kettner et al., J. Phys. G 32, 489 (2006).
[5] M. Lipoglavšek et al., Eur. Phys. J. A 44, 71(2010).

Primary author: Ms CVETINOVIC, Aleksandra (Jožef Stefan Institute)

Co-authors: Ms VESIC, Jelena (Jožef Stefan Institute); Dr LIPOGLAVSEK, Matej (Jožef Stefan Institute)

Presenter: Ms CVETINOVIC, Aleksandra (Jožef Stefan Institute)

Track Classification: Nuclear Astrophysics

Contribution ID: **212** Type: **Invited Talk - Parallel Session**

Evidence for a four-body state in 9Be through the 8Li(p,d)7Li reaction

Monday, June 22, 2015 3:40 PM (25 minutes)

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\newcommand {\lip} {\mbox{$^{8}\mathrm{Li}+p$}}
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\newcommand {\lipd} {\mbox{$^{8}\mathrm{Li}(p,d)^{7}\mathrm{Li}$}}
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\newcommand {\bepg} {\mbox{$^{7}\mathrm{Be}(p,\gamma)^{8}\mathrm{B}$}}
\newcommand {\liddp} {\mbox{$^{7}\mathrm{Li}(d,d')^{7}\mathrm{Li}^{*}$}}
\newcommand {\be} {\mbox{$^{9}\mathrm{Be}$}}
\newcommand {\li} {\mbox{$^{8}\mathrm{Li}$}}
\newcommand {\lid} {\mbox{$^{7}\mathrm{Li}+d$}}
\newcommand {\liexcd} {\mbox{$^{7}\mathrm{Li}^{*}+d$}}

\begin{document}
% do not change the conference title
\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

\vspace*{0.5cm}
\begin{center}
% insert the title of your abstract here
{\large \bf Evidence for a four-body state in
be through the
$lipd$ reaction}
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
E. Leistenschneider[1], \underline{A. L\'{e}pine-Szily}[1], P. Descouvemont[2], D. R. Mendes Jr[3],
R. Lichtenth\"aler[1], R. Pampa Condori[1], P. N. de Faria[1], V. Guimar\~aes[1], V. Scarduelli[1], E. L. A. Macchione[1], V. A. P. Aguiar[1],

J. Duarte[1], K. C. C. Pires[1], V. Morcelle[4], M. C. Morais[5], V. A. Zagatto[1,6], M. Assun\c{c}\~{a}o[7], T. Britos[7]

\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] Instituto de F\'{\i}sica
da Universidade de S\~{a}o Paulo,
Caixa Postal 66318, 05315-970, S\~{a}o Paulo, SP, Brazil} \\
{\em [2] Physique Nucl\'eaire Th\'eorique et Physique Math\'ematique, C.P. 229,\\
Universit\'e Libre de Bruxelles (ULB), B 1050 Brussels, Belgium}\\
{\em [3] Instituto de F\'{\i}sica, Universidade Federal Fluminense, Avenida Litoranea s/n, Gragoat\'a, Niter\'oi RJ 24210-340, Brazil}\\
{\em [4] Universidade Federal Rural de Rio de Janeiro
Rodovia BR 465 - Km 7 - Campus Universit\'ario - Zona Rural, Serop\'edica - RJ, Brazil}\\
{\em [5] CEFET/RJ- Campus Petropolis, Rua do imperador, 971, Centro, 25652-003, Petropolis, RJ}\\
{\em [6] Centro Universitario FIEO-UNIFIEO, Osasco, SP, Brazil}\\
{\em [7] Departamento de Ci\^encias Exatas e da Terra, Universidade Federal de S\~{a}o Paulo, Campus Diadema,
S\~{a}o Paulo, Brazil}\\

\end{center}

% write your abstract here
We report on a simultaneous study of the (p,p), (p,α) and (p,d) reactions on
li at low energies [1]. The
experiment was performed using a thick hydrogen target and a radioactive
li beam available at the RIBRAS facility
of S\~{a}o Paulo [2]. This experiment represents an upgrade of a previous experiment [3], where only the
$lipa$ cross
section was measured. A comparison
with previous direct
$lidp$ data suggests a newly observed
be resonance around $E_x = 18.67$ MeV with a
large $^7\mathrm{Li}^\star + d$ component. The
properties of this resonance are determined by a R-matrix analysis [4], which provides evidence for a significant clustering.
As the $^7\mathrm{Li}^\star$ nucleus and the deuteron present a strong deformation, this
be state can be
interpreted as a
four-body resonance. We suggest that it could be also observed in
$liddp$ inelastic scattering.

\vspace*{0.5cm}

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% write your references here

[1] E. Leistenschneider \emph{et al.}, to be published\\

[2] D. R. Mendes \emph{et al.}, Phys. Rev. C {\bf 86}, 064321 (2012)\\

[3] A.~L\'epine-Szily, R.~Lichtenth\"aler, V.~Guimar\~aes, Eur. Phys. J. A {\bf 50}, 128 (2014) \\

[4] P. Descouvemont and D. Baye, Rep. Prog. Phys. {\bf 73}, 036301 (2010)
\end{document}

Primary author: Prof. LÉPINE-SZILY, Alinka (Universidade de Sao Paulo, Brazil)

Co-authors: RIBRAS, Collaboration (Universidade de São Paulo); Mr LEISTENSCHNEIDER, Erich (Universidade de São Paulo); Dr DESCOUVEMONT, Pierre (Universite Libre de Bruxelles)

Presenter: Prof. LÉPINE-SZILY, Alinka (Universidade de Sao Paulo, Brazil)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **213** Type: **Oral presentation**

Mechanism of two-proton emission from ^{23}Al and ^{22}Mg

Thursday, June 25, 2015 6:30 PM (20 minutes)

Primary author: Prof. FANG, Deqing (Shanghai Institute of Applied Physics, Chinese Academy of Sciences, China)

Presenter: Prof. FANG, Deqing (Shanghai Institute of Applied Physics, Chinese Academy of Sciences, China)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **215** Type: **Poster**

Search for High Energy Alpha Particles in the Reactions of 7.5AMeV 197Au with 232Th

**Click here to download the template: <a href=”https://agenda.infn.it/materialDisplay.py?mater
Word , <a href=”https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235”>Lat**

S. Wuenschel, J.B. Natowitz, K. Hagel, M. Barbui, G. Giuliani, E.J. Kim, N. Blando, H. Zheng, S. Kowalski, K. Schmidt, Z. Majka, Z. Sosin, A. Wieloch.

The search for alternative reaction paths for heavy element production requires a careful experimental investigation of mechanisms other than fusion, e.g., multi-nucleon transfer or very asymmetric fission of even heavier transient systems. Many super heavy elements are expected to decay by alpha particle emission. The heaviest elements are characterized by unusually high alpha particle energies which distinguish them (in general) from the lighter elements. Using 197Au projectiles incident on a 232Th target, we are pursuing survey experiments based upon the implantation of recoiling heavy reaction products in an array of fast plastic scintillators and the detection of alpha particle decays characteristic of these heavy nuclei. The 7.5 MeV/nucleon 197Au beam was pulsed for different time intervals in order to be able to identify species with different half-lives. A large number of interesting high alpha-energy activities were detected both in-beam and out of beam. These data will be discussed, as will extensions of this method.

Primary author: Dr WUENSCHEL, S. (Cyclotron Institute, Texas A&M University)

Presenter: Dr WUENSCHEL, S. (Cyclotron Institute, Texas A&M University)

Track Classification: Heavy and Superheavy Elements

Contribution ID: **216** Type: **Oral presentation**

Exploring the 10Li structure by the d(9Li,p)10Li transfer reaction

Monday, June 22, 2015 4:25 PM (20 minutes)

Primary author: CAVALLARO, Manuela (INFN -LNS)

Presenter: CAVALLARO, Manuela (INFN-LNS, Catania, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **217** Type: **Oral presentation**

EXTRACTING THE HEXADECAPOLE PARAMETERS FROM BACKWARD QUASI-ELASTIC SCATTERING

Tuesday, June 23, 2015 5:50 PM (20 minutes)

Primary author: Dr ZHANG, H.Q. (China Institute of Atomic Energy)

Presenter: ZHANG, Huanqiao (China Institute of Atomic Energy, Beijing, China)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **218** Type: **Oral presentation**

Fusion of 16,18O + 58Ni at energies near the Coulomb barrier

Thursday, June 25, 2015 6:30 PM (20 minutes)

Primary author: Dr JIA, H.M. (China Institute of Atomic Energy, Beijing, China)

Presenter: Dr JIA, H.M. (China Institute of Atomic Energy, Beijing, China)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **220** Type: **Oral presentation**

Some Peculiarities of Interactions of Weakly Bound Lithium Nuclei at Near Barrier Energies

Thursday, June 25, 2015 6:10 PM (20 minutes)

Primary author: Dr KUTERBEKOV, K.A. (Gumilyov National University, Astana, Kazakhstan)

Presenter: Dr KUTERBEKOV, K.A. (Gumilyov National University, Astana, Kazakhstan)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **221** Type: **Invited Talk - Parallel Session**

Anisotropic flows and the shear viscosity of the QGP within an event by event transport approach

Tuesday, June 23, 2015 2:55 PM (25 minutes)

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We study the build up of elliptic flow v_2 and high order harmonics v_3, v_4 and v_5 for a fluid at fixed η/s by mean of an event-by-event transport approach. We study the effect of the η/s ratio on the build up of the $v_n(p_T)$. In particular we study the effect of a temperature dependent η/s for two different beam energies: RHIC for Au+Au at $\sqrt{s} = 200\,GeV$ and LHC for $Pb + Pb$ at $\sqrt{s} = 2.76\,TeV$. We find that for the two different beam energies considered the suppression of the $v_n(p_T)$ due to the viscosity of the medium have different contributions coming from the cross over or QGP phase. In ultra-central collisions the $v_n(p_T)$ show a strong sensitivity to the η/s ratio in the QGP phase and this sensitivity increase with the increase
of the order of the harmonic. Moreover, we discuss the correlation between the initial spatial anisotropies ϵ_n and flow coefficients v_n. We find that at LHC energies the v_n are more correlated to the initial ϵ_n respect to RHIC energies.
We find that the elliptic flow v_2 is strongly correlated with initial eccentricity ϵ_2. While higher harmonics v_3, v_4 and v_5 are weakly correlated to their asymmetry measure in coordinate space ϵ_3, ϵ_4 and ϵ_5. The degree of correlation increase with the impact parameter. At LHC energies and in ultra-central collisions we find that the linear correlation coefficent $C(n, n) \approx 1$ for $n = 2, 3, 4$ and 5.

Primary author: PLUMARI, Salvatore (INFN-LNS, Catania, Italy)

Co-authors: SCARDINA, Francesco (LNS); GUARDO, Giovanni Luca (LNS); Dr GRECO, Vincenzo (LNS)

Presenter: PLUMARI, Salvatore (INFN-LNS, Catania, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **222** Type: **Poster**

Preliminary studies for three experiments at Treiman-Yang criterion

Primary author: Dr KRES, Ievgenii (KNU Shevchenko)

Presenter: Dr KRES, Ievgenii (KNU Shevchenko)

Track Classification: Nuclear Astrophysics

Contribution ID: **223** Type: **Poster**

Semiclassical approach to sequential fission in peripheral collisions

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\begin{center}
% insert the title of your abstract here
{\large \bf Semiclassical approach to sequential fission in peripheral collisions}
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
{A. Strazzeri}[1], A. Italiano[2]
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] Dipartimento di Fisica e Astronomia dell'Universit\`{a} di Catania, Italy} \\
{\em [2] Istituto Nazionale di Fisica Nucleare, Gr. Coll. di Messina, Italy}
\end{center}

% write your abstract here
A closed-form semiclassical approach describing in a
single picture both the evaporation
component and the fast nonequilibrium component of the
sequential fission of projectilelike fragments in a peripheral heavy-ion
collision is derived and then applied to the dynamical fission observed in
the ^{124}Sn+^{64}Ni peripheral collision at 35A MeV. Information on opposite
polarization effects of the fissioning projectilelike fragments and
on "dynamical fission lifetimes" are obtained. This approach
allows, in spite of its simplicity, to reproduce

many of the observed features of both E and NE in-plane angular distributions of the heavier fragment from the PL nucleus splitting.

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% write your references here
[1] E. De Filippo \emph{et al.}, Phys. Rev. C {\bf 71}, (2005) 064604, and references therein.

[2] A. Strazzeri and A. Italiano,
Int. J. Mod. Phys. E {\bf 23}, (2014) 1450081, and references therein.

\end{document}

Primary author: Prof. STRAZZERI, Andrea (Dip. Fisica e Astronomia, Universita' di Catania)

Co-author: Dr ITALIANO, Antonio (INFN, G.C. Messina, Italy)

Presenter: Dr ITALIANO, Antonio (INFN, G.C. Messina, Italy)

Track Classification: Fusion and Fission

Contribution ID: **224** Type: **Oral presentation**

Recent results from NA61/SHINE

Monday, June 22, 2015 4:20 PM (20 minutes)

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The main physics goals of the NA61/SHINE programme on strong interactions are the study of the properties of the onset of deconfinement and the search for signatures of the critical point of strongly interacting matter. These goals are pursued by performing an energy (beam momentum 13A –
158A~GeV/c) and system size (p+p, p+Pb, Be+Be, Ar+Sc, Xe+La) scan.

Moreover the experiment provides precision hadron production measurements needed for neutrino beams at J-PARC and Fermilab as well as for air shower simulations of cosmic-ray experiments (Pierre Auger Observatory, KASCADE-Grande and KASCADE).

This talk reviews results and plans of NA61/SHINE.
In particular, recent inclusive spectra and new results on fluctuations and correlations of identified hadrons in inelastic p+p and centrality selected Be+Be interactions at the SPS energies will be shown. The energy dependence of quantities inspired by the Statistical Model of Early Stage (kink, horn and step) show interesting behavior in p+p collisions, which is not described by Monte-Carlo models.

Furthermore, the Be+Be data suggest collective flow to develop even in collisions of low mass nuclei.

Primary author: KOWALSKI, Seweryn (University of Silesia, Katowice, Poland)

Presenter: KOWALSKI, Seweryn (University of Silesia, Katowice, Poland)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **225** Type: **Oral presentation**

Dissipative effects in fission investigated with proton-on-lead reactions

Tuesday, June 23, 2015 4:15 PM (20 minutes)

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Word , Lat**

J.L. Rodríguez-Sánchez1, J. Benlliure1, H. Álvarez-Pol1, L. Audouin2, Y. Ayyad1, G. Bélier3, G. Boutoux3, E. Casarejos4, A. Chatillon3, D. Cortina-Gil1, T. Gorbinet2, A. Heniz5, A. Kelic-Heil6, B. Laurent3, J.F. Martin3, C. Paradela1, E. Pellereau3, B. Pietras1, D. Ramos1, C. Rodríguez-Tajes7, D. Rossi6, H. Simon6, J. Täieb3, L. Tassan-Got2, J. Vargas1, and B. Voss6

1 University of Santiago de Compostela, E-15782, Spain
2 Institut de Physique Nucléaire d’Orsay, F-91406, France
3 CEA, DAM, F-91297, France
4 Universidad de Vigo, E-36200, Spain
5 Chalmers University of Technology, SE-412 96, Sweden
6 GSI, D-64291, Germany
7 Grand Accélérateur National d’ions Lourds, F-14076, France

Primary author: Mr RODRIGUEZ SANCHEZ, Jose Luis (University of Santiago de Compostela, Spain)

Presenter: Mr RODRIGUEZ SANCHEZ, Jose Luis (University of Santiago de Compostela, Spain)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **226** Type: **Oral presentation**

Influence of Skyrme-type Momentum Dependent Interaction on HICs Observables

Monday, June 22, 2015 4:45 PM (20 minutes)

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A new version of the improved quantum molecular dynamics model has been developed by including Skyrme type momentum dependent interaction. Four Skyrme parameter sets, SLy4, SkI2, SkM, *Gs, and 12 kinds of MSL ({K_0, S_0, L, m_s^*, m_v^*}) parameter sets are adopted in the transport model code to calculate the isospin diffusion, single and double ratios of transverse emitted nucleons, neutron proton isoscaling ratios. The calculations evidence that isospin diffusion observable at lower beam energy is sensitive to the slope of symmetry energy. The high energy neutrons and protons and their ratios from reactions at different incident energies provide a robust observable to study the momentum dependence of symmetry potential, which is related to the nucleon effective mass splitting, at higher beam energy. Furthermore, the covariance analysis are performed to quantify the correlation between the interaction parameters in a transport model and the HIC observables commonly used to extract information of Equation of State in asymmetric nuclear matter.

Primary author: Prof. ZHANG, Yingxun (China Institute of Atomic Energy, Beijing, China)

Co-authors: Prof. TSANG, Betty (Michigan State University); Prof. LI, zhuxia (China institute of Atomic Energy)

Presenter: Prof. ZHANG, Yingxun (China Institute of Atomic Energy, Beijing, China)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **227** Type: **Poster**

Nuclear Reactions in Laser Plasmas

Primary author: Dr LANZALONE, G. (kore & lns)

Presenter: Dr LANZALONE, G. (kore & lns)

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **228** Type: **Oral presentation**

Progress in MAGNEX focal plane detector

Thursday, June 25, 2015 4:00 PM (20 minutes)

Primary author: Dr MUOIO, Anna Maria (INFN-LNS, Catania & Uversity of Messina, Italy)

Presenter: Dr MUOIO, Anna Maria (INFN-LNS, Catania & Uversity of Messina, Italy)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **230** Type: **Oral presentation**

Exploring dissipative processes at high angular momentum

Thursday, June 25, 2015 5:50 PM (20 minutes)

Primary author: Dr WILLIAMS, Elizabeth (Australian National University, Canberra, Australia)

Presenter: Dr WILLIAMS, Elizabeth (Australian National University, Canberra, Australia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **231** Type: **Oral presentation**

Jet fragmentation study with particle correlation from the ALICE experiment at LHC

Monday, June 22, 2015 4:00 PM (20 minutes)

Primary author: Dr KIM, Dong Jo (Jyvasklya Univisity)

Presenter: Dr KIM, Dong Jo (Jyvasklya Univisity)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **232** Type: **Oral presentation**

High-spin Molecular Resonances in 12C+12C

Tuesday, June 23, 2015 6:25 PM (20 minutes)

Primary author: Prof. UEGAKI, Eiji (Akita University, Japan)

Co-author: Dr ABE, Yasuhisa (RCNP, Osaka University, Japan)

Presenter: Prof. UEGAKI, Eiji (Akita University, Japan)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **233** Type: **Oral presentation**

Measuring fusion excitation functions with RIBsusing the stacked target technique: problems and possible solutions

Tuesday, June 23, 2015 4:20 PM (20 minutes)

Primary authors: Prof. SHOTTER, Alan (School of Physics and Astronomy, University of Edinburgh); DI PIETRO, Alessia Francesca (LNS); Mrs FISICHELLA, Maria (INFN-LNS, Catania, Italy); FIGUERA, Pierpaolo (LNS)

Co-authors: Dr RUIZ, Chris (TRIUMF, Vancouver, Canada); LATTUADA, Marcello (LNS); Dr ZADRO, Mile (Ruder Boskovic Institut, Zagreb, Croatia)

Presenter: Mrs FISICHELLA, Maria (INFN-LNS, Catania, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **234** Type: **Oral presentation**

Effects of the interstrip gap on the efficiency and response of Double Sided Silicon Strip Detectors

Thursday, June 25, 2015 3:20 PM (20 minutes)

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Highly segmented double sided silicon detectors (DSSSD) are widely used in nuclear physics to perform accurate measurements of angular distributions, or to study reactions where coincidences of different particles are required to fully characterize the final state of the interaction process. It is well known that when a particle hits the SiO2 insulating interstrip region, one can observe, in the two adjacent strips, signals with an amplitude which is different than the full energy one including opposite polarity signals [1-5]. For this reason, when analysing data gathered by using DSSSDs, it is very important to reject interstrip events by selecting only the ones producing the correct full energy signals. This results in an efficiency for full energy detection less than 100%.
For the first time, we performed [6] a systematic characterisation of DSSSDs response as function of the incident ion, energy, and polarization voltage, trying to identify an appropriate selection procedure of events which allows to maximize the efficiency for the full energy reconstruction. First tests, using 7Li and 16O beams at different energies, showed that the efficiency for full energy detection depends on the energy of the detected ion and on the applied bias voltage. Moreover, it was observed that the measured efficiency is different than the one extracted by simply considering the geometrical width of the SiO2 zone. This means that the effective width of the inter-strip region is different than the geometric one declared by the manufacturer. In addition, systematic measurements of the effective width of the inter-strip gap were performed by scanning the front and back inter-strip regions using proton micro-beams at different energies and for different detector bias [7]. Results show that both front and back effective inter-strip width can be much larger than the nominal geometric width of the SiO2 zone and that both depend on the DSSSD type, and operating conditions. The results were interpreted by a simplified model based on the Shockley-Ramo-Gunn framework, it show that assuming the buildup of positive charge at the SiO2 interface one can obtain a satisfactory reproduction of all the observed interstrip effects.
In conclusion, the front and back effective interstrip width, which in turn is related to the DSSSD efficiency for full energy detection, depends on the DSSSD type, on its polarization voltage, and on the energy and charge of the detected ions. Therefore for those experiments aiming to measure, for instance, absolute cross-section with high precision, a complete characterization of the used DSSSDs is desirable.

Primary author: Dr TORRESI, Domenico (INFN-LNS, Catania, Italy)

Co-authors: DI PIETRO, Alessia Francesca (LNS); Mr STANKO, Davor (University of Zagreb); Dr FORNERIS, Jacopo (Università di Torino); ACOSTA SANCHEZ, LUIS ARMANDO (C); GRASSI, Laura (PD); Mr PREPOLEC, Lovro (Rudjer Boskovic Institute); LATTUADA, Marcello (LNS); Mrs FISICHELLA, Maria (LNS); Dr MILIN, Matko (University of Zagreb); Dr ZADRO, Mile (Ruder Boskovic Institute); Dr JAKSIC, Milko (Dr.); UROIC, Millivoi (Ruder Boskovic Institute); Mr SKUKAN, Natko (Rudjer Boskovic Institute); Dr SOIC, Neven (Rudjer Boskovic Institute); FIGUERA, Pierpaolo (LNS); Dr MIJATOVIC, Tea (Ruder Boskovic Institute); Dr GRILJ, V. (Ruder Boskovic Insitute); Mrs TOKIC, Vedrana (Rudjer Boskovic Institute)

Presenter: Dr TORRESI, Domenico (INFN-LNS, Catania, Italy)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **235** Type: **Oral presentation**

Exploration of Direct Neutron Capture with Covariant Density Functional Theory Inputs

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Predictions of direct neutron capture are of vital importance for simulations of nucleosynthesis in supernovae, merging neutron stars, and other astrophysical environments.
We calculated direct capture cross sections using nuclear structure information
obtained from a covariant density functional theory as input for the FRESCO coupled reaction channels code.
We investigated the impact of pairing, spectroscopic factors,
and optical potentials on our results to determine a robust method to calculate cross sections of direct neutron capture on exotic nuclei.
Our predictions agree reasonably well with experimental cross section data for the
closed shell nuclei O-16 and Ca-48, and for the exotic nucleus S-36.
We then used this approach to calculate the direct neutron capture cross section on the doubly magic unstable nucleus Sn-132
which is of interest for the astrophysical r-process.

Primary authors: Dr SMITH, Michael (Physics Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831); Dr ZHANG, shisheng (School of Physics and Nuclear Energy Engineering, Beihang University, Beijing, China)

Co-author: Dr ARBANAS, Goran (Reactor and Nuclear Systems Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6171 USA)

Presenter: Dr ZHANG, shisheng (School of Physics and Nuclear Energy Engineering, Beihang University, Beijing, China)

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **236** Type: **Oral presentation**

Understanding the path length dependence of jet quenching in Heavy Ion Collisions from RHIC to LHC

Tuesday, June 23, 2015 4:20 PM (20 minutes)

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\begin{center}
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%{\large \bf Study of R_{AA} as function of Path-length with Flow harmonics and Glauber simulation in AA collisions}
{\large \bf Understanding the path length dependence of jet quenching in Heavy Ion Collisions from RHIC to LHC}
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
\underline{Myunggeun Song}[1], D.J~Kim[2]
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] Yonsei University, South Korea} \\
{\em [2] University of Jyv\"{a}skyl\"{a}, Finland}\\
\end{center}

% write your abstract here
The centrality dependence of nuclear modification factor(R_{AA}) carries information about path-length dependent partonic energy loss because mean path-length increases as the centrality increases. However, for a given centrality, inclusive R_{AA} emerges by averaging over different path-lengths which depend on the azimuthal angle w.r.t. the reaction plane assuming elliptical shape

of overlapping zone of two colliding nuclei in the transverse plane. In this sense, azimuthal dependence of R_{AA} w.r.t. reaction plane offers to get a tighter constraint on the actual path length traversed by the parton in medium. As the azimuthal angle can be converted into the path-length with Glauber simulation[1] of two colliding nuclei, R_{AA} can be represented as a function of not only p_T, but also path-length. By utilizing the existing data from RHIC to LHC[2][3][4], we will show that R_{AA} seems to be aligned with respect to path-length, regardless of centralities in high transverse momentum regions ($p_T > 5GeV$/c) both for RHIC and LHC, and scales like universal function of square of Path-length. These results permit a detailed examination of the influence of geometry in the collision region and of the interplay between collective flow and jet-quenching effects.
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% write your references here
[1] M. L. Miller, et al, Ann.Rev.Nucl.Part.Sci. 57:205-243 (2007) \\ \
[2] ALICE, K. Aamodt et al., Phys. Lett. B696, 30 (2011), 1012.1004.\\ \
[3] ALICE Collaboration, K. Aamodt et al., Phys. Rev. Lett. 105, 252301 (2010).\\ \
[4] CMS Collaboration, Phys. Rev. Lett.87.014902 (2012) \\ \

\end{document}

Primary authors: Dr KIM, Dong Jo (Jyvasklya Univisity); Mr SONG, Myunggeun (Yonsei University, Seoul, Republic of Korea)

Co-author: Prof. KANG, Juhwan (Yonsei University)

Presenter: Mr SONG, Myunggeun (Yonsei University, Seoul, Republic of Korea)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **237** Type: **Oral presentation**

Elastic, inelastic and breakup cross sections in 6Li+112Sn system

Thursday, June 25, 2015 5:50 PM (20 minutes)

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Study of reactions involving weakly bound projectiles is very interesting because of the observation of several unusual features compared to the case of strongly bound projectiles. Suppression of complete fusion, breakup threshold anomaly in optical potential describing elastic scattering and a large production of alpha particles in the reactions are some of those interesting observations [1]. Projectile breakup in the field of a target nucleus is known to play an important role in the manifestation of all the above features. To understand the underlying reaction mechanism, the experimental data on projectile breakup cross section is thus very important to compare with the coupled-channels calculations that include the breakup channels. In order to constrain the values of coupling parameters and the potentials in the coupled-channels calculations it is also important to reproduce simultaneously the experimental data for as many reaction channels as possible for the same target+projectile.

With the above motivation, the elastic, inelastic, transfer and breakup cross sections for 6Li+112Sn system have been measured at a bombarding energy of 30 MeV using BARC-TIFR Pelletron facility at Mumbai. Four telescopes of single Si detectors (covering 30 degree) and two telescopes of double sided 16-strip Si detectors (covering 35 degree) were used for the above purpose. Preliminary results obtained from the data of single telescopes and two monitors are shown in Figure 1 below. Differential cross sections for the elastic scattering normalized with the Rutherford cross sections are shown in Fig.1(a). The inelastic cross sections corresponding to 112Sn(2+,1.25 MeV) and 112Sn(3-,2.35 MeV) are shown in Fig.1(b) and (c) respectively. The exclusive breakup cross sections corresponding to the 1st resonant state of 6Li (3+,2.18 meV) is shown in Fig.1(c). The cross sections for projectile breakup have been extracted following the procedure as described in Ref.[2].

Continuum-discretized-coupled-channels (CDCC) calculations are performed using FRESCO to estimate the projectile breakup cross sections. Breakup channels that are included in the CDCC calculations are similar to the ones in Ref.[2]. Results of the coupled-channels calculations that explain the measured data simultaneously are shown by the solid lines in Fig.1.

Fig.1.(a) Elastic, (b,c) inelastic and (c) breakup cross sections measured at Ebeam=30 MeV

[1]S. Santra et al., Phys.Rev.C 90,064620 (2014), Phys.Rev.C 83,034616 (2011),), Phys.Rev.C 85,014612 (2012), and references therein.
[2]S. Santra et al., Phys.Lett.B 677, 139 (2009).

Primary author: Dr SANTRA, Satyaranjan (Bhabha Atomic Research Centre, India)

Presenter: Dr SANTRA, Satyaranjan (Bhabha Atomic Research Centre, India)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **238** Type: **Oral presentation**

Open heavy-flavour measurements with ALICE at the LHC

Monday, June 22, 2015 3:40 PM (20 minutes)

Primary author: Prof. BASTID, Nicole (LPC Clermont-Ferrand, Aubiere, France)

Presenter: Prof. BASTID, Nicole (LPC Clermont-Ferrand, Aubiere, France)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **239** Type: **Oral presentation**

Fluctuations of conserved charges and freeze-out conditions in heavy ion collisions

Thursday, June 25, 2015 3:40 PM (20 minutes)

Click here to download the template: <a href="https://agenda.infn.it/materialDisplay.py?mater Word , <a href="https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235">Lat

I will review the recent results on fluctuations of conserved charges obtained on the lattice by the Wuppertal-Budapest collaboration. I will then show a comparison between lattice QCD calculations and experimental data from the RHIC beam energy scan, in order to extract the chemical freeze-out parameters (temperature and baryo-chemical potential) of a heavy-ion collision from first principles. Future perspectives for the measurement of strangeness fluctuations will be discussed.

Primary author: Prof. RATTI, Claudia (University of Houston, USA)

Co-authors: Dr SZABO, Kalman (University of Wuppertal); SANDOR, Katz (Institute for Theoretical Physics, Eötvös University); STEFAN, Krieg (Forschungszentrum Juelich,); Dr BORSANYI, Szabolcs (University of Wuppertal); FODOR, Zoltan (University of Wuppertal)

Presenter: Prof. RATTI, Claudia (University of Houston, USA)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **240** Type: **Oral presentation**

Overview of azimuthal correlation measurements from ALICE

Tuesday, June 23, 2015 3:20 PM (20 minutes)

Primary author: Dr ZHOU, You (Niels Bohr Institute, Copenhagen, Denmark)

Presenter: Dr ZHOU, You (Niels Bohr Institute, Copenhagen, Denmark)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **241** Type: **Poster**

Hadronic “flow” in p−Pb collisions at the Large Hadron Collider?

Primary author: Mr ZHOU, You (Niels Bohr Institute)

Co-authors: Prof. SONG, Huichao (Peking University); Mr LI, Pengfei (Peking University); Dr ZHU, Xiangrong (Peking University)

Presenter: Mr ZHOU, You (Niels Bohr Institute)

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **242** Type: **Invited Talk - Parallel Session**

Systematic study of quasifission characteristics and timescales in heavy element formation reactions

Thursday, June 25, 2015 2:55 PM (25 minutes)

Primary author: Prof. HINDE, David (Australian National University, Canberra, Australia)

Presenter: Prof. HINDE, David (Australian National University, Canberra, Australia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **243** Type: **Poster**

Exploring the high spin states of ^{88}Zr

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Word , <a href="https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235">Lat**

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\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

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\begin{center}
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{\large \bf Exploring the high spin states of ^{88}Zr}
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
\underline{S. Saha}[1], R. Palit[1], J. Sethi[1], S. Biswas[1], P. Singh[1], D. Choudhury[1], P. C. Srivastava[2]
\end{center}

\begin{center}
% these are the corresponding institutions
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{\em [2] Department of Physics, Indian Institute of Technology, Roorkee - 247667, India}\\
\end{center}

% write your abstract here

Understanding of the complex structure and dynamics of a nuclear system requires investigation of motion of the constituent nucleons and their mutual interactions. The high spin states of a nucleus near shell closure provide unique test bench for exclusively studying the excitations of the valence shell nucleons in the nuclear mean field and the residual interactions. In addition, a number of interesting phenomena are observed in doubly closed shell nuclei, like, the evolution of collectivity and presence of high spin isomers, to mention a few \cite{heyde11}. Nuclei around ^{90}Zr having $Z = 40$ sub-shell closure and $N = 50$ major shell closure are perfect candidates to probe these emergent phenomena \cite{ssaha12}.

Recently, the high spin states of ^{88}Zr were populated with ^{13}C(^{80}Se,5n) reaction using ^{13}C beam at 60 MeV from TIFR-BARC pelletron facility \cite{ssaha14}. The γ-rays emitted from the residual nuclei were detected using 18 Compton suppressed clover HPGe array, know as INGA \cite{pa12}. The energy, spin and parity of several states of ^{88}Zr have been assigned. The results have been compared with large scale shell model calculations for full unrestricted f_5pg_9 model space using two recently developed interactions JUN45 \cite{honma09} and jj44b \cite{brown}. Although, there are overall good agreement between the calculated and the experimental results, at high spin their differences have been observed to be increased. To explore further higher spin states a more symmetric reaction was performed using ^{30}Si beam and ^{65}Cu target at 137 MeV. A number of high energy transitions have been observed indicating contribution from particle excitation across the 50 shell gap.
In this conference, the spectroscopic study of ^{88}Zr produced using the two different reactions will be presented and the results will be interpreted using large scale shell model calculations.

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\begin{thebibliography}{20}

\bibitem{heyde11} K. Heyde and J. L. Wood, Rev. Mod. Phys. {\bf 83} (2011) 1467.
\bibitem{ssaha12} S. Saha {\it et al.}, Phys. Rev. C {\bf 86} (2012) 034315.
\bibitem{ssaha14} S. Saha {\it et al.}, Phys. Rev. C {\bf 89} (2014) 044315.
\bibitem{pa12} R. Palit {\it et al.}, Nucl. Instrum. Methods A {\bf 680} (2012) 90.
\bibitem{honma09} M. Honma, T. Otsuka, T. Mizusaki and M Hojorth-Jensen, Phys. Rev. C {\bf 80} (2009) 064323.
\bibitem{brown} B. A. Brown and A. F. Lisetski (unpublished).

\end{thebibliography}

\end{document}

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Presenter: Mr SAHA, Sudipta (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India)

Track Classification: Nuclear Structure

Contribution ID: **244** Type: **Poster**

The effect of the angle dependence of the pairing gap on the 3SD1 superfluidity in asymmetric nuclear matter

Primary author: Dr SHANG, Xinle (neutron-proton pairing)

Co-author: Prof. ZUO, Wei (Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China)

Presenter: Dr SHANG, Xinle (neutron-proton pairing)

Track Classification: Nuclear Astrophysics

Contribution ID: **245** Type: **Oral presentation**

The Isomeric State Measurement System (SISMEI)

Primary author: Prof. TOUFEN, Dennis Lozano (Federal Institute of São Paulo)

Co-authors: Prof. CYBULSKA, Ewa (University of São Paulo); Prof. OLIVEIRA, Jose Roberto (University of São Paulo); Prof. SILVEIRA, Marcilei (Universitary Center of FEI); Prof. MEDINA, Nilberto (University of São Paulo); Dr ALLEGRO, Paula R P (University of São Paulo); Prof. LINARES, Roberto (Fluminense Federal University); Prof. RIBAS, Roberto (University of São Paulo); Prof. SEALE, Wayne (University of São Paulo)

Presenter: Prof. TOUFEN, Dennis Lozano (Federal Institute of São Paulo)

Track Classification: New Facilities and Detectors

Contribution ID: **246** Type: **Oral presentation**

High-spin states in $N = 50$ ^{89}Y and ^{91}Nb nuclei: Probing πfp-νdg effective interaction

Tuesday, June 23, 2015 4:15 PM (20 minutes)

Primary author: Dr SINGH, Purnima (Tata Institute of Fundamental Research, Mumbai, India)

Co-authors: Mr ASGAR, A. (Variable Energy Cyclotron Centre, 1/AF Bidhannagar, Kolkata 700064, India); Dr SINHA, A. K. (UGC-DAE Consortium for Scientific Research, Kolkata Centre, Kolkata 700098, India); Mr GHOSH, C. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India); Dr BISWAS, D. C. (Nuclear Physics Division, Bhabha Atomic Research Centre, Mumbai - 400085, India); Dr CHOUDHURY, D. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India); Dr MUKHERJEE, G. (Variable Energy Cyclotron Centre, 1/AF Bidhannagar, Kolkata 700064, India); Prof. JAIN, H. C. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India); Ms SETHI, J. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India); Mr DANU, L. S. (Nuclear Physics Division, Bhabha Atomic Research Centre, Mumbai - 400085, India); Dr SRIVASTAVA, P. C. (Department of Physics, Indian Institute of Technology, Roorkee-247667, India); Dr PALIT, R. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India); Dr RAUT, R. (UGC-DAE Consortium for Scientific Research, Kolkata Centre, Kolkata 700098, India); Ms BISWAS, S. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India); Dr TANDEL, S. K. (UM-DAE Centre for Excellence in Basic Sciences, Mumbai 400098, India); Dr MUKHOPADHYAY, S. (Nuclear Physics Division, Bhabha Atomic Research Centre, Mumbai - 400085, India); Dr MURALITHAR, S. (Inter University Accelerator Centre, Aruna Asaf Ali Marg, New Delhi - 110067, India); Dr GHUGRE, S. S. (UGC-DAE Consortium for Scientific Research, Kolkata Centre, Kolkata 700098, India); Mr SAHA, S. (Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai - 400005, India)

Presenter: Dr SINGH, Purnima (Tata Institute of Fundamental Research, Mumbai, India)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **247** Type: **Poster**

Elastic scattering of 17O+208Pb at energies near the Coulomb barrier.

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In the last decades the study of the reaction mechanisms at energies around the Coulomb barrier for halo and weakly bound nuclei has attracted a large interest. The peculiar characteristics of these nuclei can affect deeply their reaction dynamics increasing or enhancing the total reaction cross section and/or specific reaction channels (for instance, breakup, transfer, fusion).
Thus, it is quite important to have a large and reliable systematics of reaction cross section measurements for stable nuclei interacting with light, medium and heavy targets in order to compare the behavior of exotic nuclei with that of stable and strongly bound nuclei.
We measured at the Laboratori Nazionali di Legnaro the elastic scattering process for the system 17O+208Pb in the energy range 80 - 87 MeV. This measurement, performed within the commissioning of the detection system EXPADES [1], is particularly relevant since 17O is the mirror nucleus of the radioactive and weakly-bound projectile 17F (Sp = 0.6 MeV). The elastic scattering angular distributions were analyzed within the framework of the optical model using the code FRESCO [2] to extract the total reaction cross section. The data will be compared with those obtained for the neighboring systems 16,18O+208Pb and others available in literature [3].
[1] E. Strano et al., Nucl. Instr. and Meth. B 317, 657 (2013).
[2] I.J. Thompson, Comput. Phys. Rep. 2, 167 (1998).
[3] N. Keeley, K.W. Kemper and K. Rusek, Eur. Phys. J. A 50, 145 (2014) and references therein.

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Presenter: TORRESI, Domenico (LNS)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **248** Type: **Oral presentation**

Clustering effects in fusion evaporation reactions with light even-even N=Z nuclei. The 24Mg and 28Si cases.

Primary author: MORELLI, Luca (BO)

Presenter: MORELLI, Luca (BO)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **249** Type: **Poster**

TRACE and GASPARD: direct reactions with AGATA@SPES

Primary author: MENGONI, Daniele (PD)

Co-author: BEAUMEL, Didier (IPN-Orsay)

Presenter: MENGONI, Daniele (PD)

Track Classification: New Facilities and Detectors

Contribution ID: **250** Type: **Oral presentation**

Overview of jet physics with ALICE at the LHC

Tuesday, June 23, 2015 6:30 PM (20 minutes)

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A cross-over "transition" between ordinary nuclear matter and a state of deconfined quarks and gluons, the Quark Gluon Plasma (QGP), is predicted by lattice QCD calculations at low chemical potential and high temperature in the nuclear phase diagram. Experimentally, ultra-relativistic heavy ion collisions are used to produce and study the hot and dense QGP medium.
Produced in a hard scattering at the early stage of the collision a highly energetic parton is first expected to lose energy in the medium before fragmenting into a hadronic spray of particles called jet. A detailed study of the modification of the jet structure and of its fragmentation pattern in vacuum and in medium should provide us with some insights into the QGP properties.
An overview of recent results on jet physics from the ALICE experiment at the LHC will be presented. After presenting results on jet spectra and nuclear modification factors, we will focus on jet structure and fragmentation observables in different sub-systems p-p, p-Pb and Pb-Pb.

Primary author: Mr WANG, Mengliang (SUBATECH, Nantes, France)

Presenter: Mr WANG, Mengliang (SUBATECH, Nantes, France)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **251** Type: **Poster**

Indirect study of the 16O+16O fusion reaction toward stellar energies by the Trojan Horse Method

Primary author: Dr HAYAKAWA, Seiya (Center for Nuclear Study, University of Tokyo)

Presenter: Dr HAYAKAWA, Seiya (Center for Nuclear Study, University of Tokyo)

Track Classification: Nuclear Astrophysics

Contribution ID: **252** Type: **Oral presentation**

Recent developments of SOLEROO: Australia's first high energy radioactive Ion Beam capability

Primary author: Mr CARTER, Ian (Department of Nuclear Physics, The Australian National University, Australia)

Presenter: Mr CARTER, Ian (Department of Nuclear Physics, The Australian National University, Australia)

Track Classification: New Facilities and Detectors

Contribution ID: **253** Type: **Invited Talk - Parallel Session**

High pt Identified Particle Production in ALICE

Thursday, June 25, 2015 2:55 PM (25 minutes)

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Measurements of the transverse momentum spectra of light flavor particles at intermediate and high pT are an important tool for QCD studies. In pp collisions they provide a baseline for perturbative QCD, while in Pb-Pb they are used to investigate the suppression caused by the surrounding medium. In p-Pb collisions, such measurements provide a reference to disentangle final from initial state effects and thus play an important role in the search for signatures of the formation of a deconfined hot medium. While the comparison of the p-Pb and Pb-Pb data indicates that initial state effects do not play a role in the suppression of hadron production observed in heavy ion collisions, several measurements of particle production in the low and intermediate pT region indicate the presence of collective effects. The evolution of RAA for identified and unindentified particles with centrality and pT will be discussed and compared to theoretical predictions as well as lower energy measurements.

Primary author: Prof. TOIA, Alberica (Uni Frankfurt and GSI, Germany)

Presenter: Prof. TOIA, Alberica (Uni Frankfurt and GSI, Germany)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **264** Type: **Poster**

Highlights of the ISOLDE Facility and the HIE-ISOLDE Project

Primary author: Prof. G. BORGE, Maria J (ISOLDE-CERN)

Presenter: Prof. G. BORGE, Maria J (ISOLDE-CERN)

Track Classification: New Facilities and Detectors

Contribution ID: **273** Type: **Oral presentation**

Clusters in heavy ion collisions and the symmetry energy

Tuesday, June 23, 2015 6:45 PM (20 minutes)

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Word , <a href="https://agenda.infn.it/materialDisplay.py?materialId=2&confId=5235">Lat**

M. Colonna1, M. Di Toro1, M. Pfabe-Zielinska2, H.H. Wolter3*1 LNS_INFN, Catania, Italy, 2 Smith College, Northampton, USA, 3 Univ. of Munich, Munich, Germany*presenter

Clusters of different sizes are copious in the final state of low and intermediate energy heavy ion collisions. The N/Z ratio of clusters and the ratio of isotopic pairs of clusters are a sensitive probe of the nuclear symmetry energy. In this contribution we will review from a theoretical point of view the sensitivity of different observables and the conclusions that have been drawn from this in the work of our group. In particular, we will discuss the information gained from light cluster emission, driven by few-body correlations, and from intermediate mass fragments, subject to isospin transport. From light cluster emission one may learn not only about the density dependence of the symmetry energy but also about the proton/neutron effective mass splitting.

Primary author: Prof. WOLTER, Hermann Wolter (University of Munich, Germany)

Presenter: Prof. WOLTER, Hermann Wolter (University of Munich, Germany)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **274** Type: **Invited talk - Plenary Session**

Chiral nucleon-nucleon forces in nuclear structure calculations

Monday, June 22, 2015 1:15 PM (30 minutes)

Presenter: CORAGGIO, Luigi (INFN-Napoli, Italy)

Session Classification: QCD and Hadron Physics

Contribution ID: **290** Type: **Poster**

symmetry energy of finite nuclei and nuclear matter

Primary author: Dr DONG, Jianmin (Institute of Modern Physics, Chinese Academy of Sciences)

Presenter: Dr DONG, Jianmin (Institute of Modern Physics, Chinese Academy of Sciences)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **296** Type: **Invited Talk - Parallel Session**

Dynamics of fusion, fission, and quasifission

Monday, June 22, 2015 3:40 PM (25 minutes)

Presenter: Prof. UMAR, Sait (Vanderbilt University, Nashville, USA)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **297** Type: **Invited Talk - Parallel Session**

Masses, Fission, and β-decay for Astrophysics and SHE

Monday, June 22, 2015 4:05 PM (25 minutes)

Presenter: MOLLER, P (Los Alamos National Laboratory, USA)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **298** Type: **Invited Talk - Parallel Session**

Search for new superheavy elements with Z=119 and Z=120 at the gas-filled recoil separator TASCA at GSI Darmstadt

Monday, June 22, 2015 4:30 PM (25 minutes)

Presenter: Prof. DÜLLMANN, Christoph (Johannes Gutenberg University Mainz, Germany)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **301** Type: **Invited Talk - Parallel Session**

New results in lattice scattering using the adiabatic projection method

Monday, June 22, 2015 3:15 PM (25 minutes)

Presenter: Prof. LEE, Dean (North Carolina State University, USA)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **302** Type: **Invited Talk - Parallel Session**

Emission of neutrino-antineutrino pairs by hadronic bremstrahlung processes

Monday, June 22, 2015 3:40 PM (25 minutes)

Presenter: BACCA, Sonia (TRIUMF, Vancouver, Canada)

Session Classification: QCD and Hadron Physics

Track Classification: QCD and Hadron Physics

Contribution ID: **308** Type: **Invited Talk - Parallel Session**

Probing nucleon-nucleon correlations in heavy ion transfer reactions

Monday, June 22, 2015 3:15 PM (25 minutes)

Presenter: Dr SZILNER, Suzana (Ruder Boskovic Institute, Zagreb, Croatia)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **313** Type: **Invited Talk - Parallel Session**

Excited nuclear matter at Fermi energies: from transport properties to the equation of state

Monday, June 22, 2015 3:15 PM (25 minutes)

Presenter: LOPEZ, O. (Laboratoire de Physique Corpusculaire de Caen, France)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **318** Type: **Invited Talk - Parallel Session**

Electric Dipole Response of Nuclei and the Symmetry Energy of the Nuclear Equation of State

Monday, June 22, 2015 3:15 PM (25 minutes)

Presenter: TAMII, Atsushi (Research Center for Nuclear Physics, Osaka University, Ibaraki, Japan)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **324** Type: **Invited Talk - Parallel Session**

(anti)hypernuclei and 3H lifetime puzzle

Monday, June 22, 2015 3:15 PM (25 minutes)

Presenter: MA, Yu-Gang (Shanghai Institute of Applied Physics, CAS, China)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **325** Type: **Invited talk - Plenary Session**

Hadron formation in relativistic nuclear collisions and the QCD phase diagram

Tuesday, June 23, 2015 10:00 AM (30 minutes)

Presenter: BECATTINI, Francesco (Università di Firenze, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **332** Type: **Invited Talk - Parallel Session**

J/PSI production in HI collisions and related items

Tuesday, June 23, 2015 2:30 PM (25 minutes)

Presenter: ARNALDI, Roberta (INFN Torino, Italy)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **337** Type: **Invited Talk - Parallel Session**

Timelines in Breakup: Sub-zeptosecond processes in near-barrier reaction dynamics

Tuesday, June 23, 2015 5:00 PM (25 minutes)

Presenter: DASGUPTA, Mahananda (Australian National University, Canberra, Australia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **343** Type: **Invited Talk - Parallel Session**

The Muon Portal Project: A large area tracking detector for muon tomography

Tuesday, June 23, 2015 2:30 PM (25 minutes)

Presenter: RIGGI, Francesco (University of Catania, Italy)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **344** Type: **Invited Talk - Parallel Session**

A Compton camera prototype for prompt-gamma medical imaging

Tuesday, June 23, 2015 2:55 PM (25 minutes)

Presenter: THIROLF, Peter (Ludwig-Maximilians-University Munich, Garching, Germany)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **345** Type: **Invited Talk - Parallel Session**

Laser-based Acceleration for Nuclear Physics experiments at ELI-NP

Tuesday, June 23, 2015 3:20 PM (25 minutes)

Presenter: Dr TESILEANU, Ovidiu (ELI-NP, IFIN-HH, Magurele, Romania)

Session Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Track Classification: Nuclear Energy and Applications of Nuclear Science and Technologies

Contribution ID: **349** Type: **Invited Talk - Parallel Session**

Electromagnetic and neutral-weak response functions of 4He and 12C

Tuesday, June 23, 2015 2:30 PM (25 minutes)

Presenter: LOVATO, Alessandro (Argonne National Laboratory, IL,USA)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **352** Type: **Oral presentation**

Spatial properties of pairing and quarteting correlations in nuclei

Tuesday, June 23, 2015 3:35 PM (20 minutes)

Presenter: BARAN, Virgil V. ("Horia Hulubei" National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **356** Type: **Invited Talk - Parallel Session**

Static and dynamics effects in the elastic scattering of light radioactive nuclei elastic: the 6He, 7,10Be, 8B and 10C cases

Thursday, June 25, 2015 2:30 PM (25 minutes)

Presenter: Dr GUIMARAES, Valdir (Universidade de São Paulo - São Paulo - Brazil)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **362** Type: **Invited Talk - Parallel Session**

Symmetry Energy in Structure and in Central and Direct Reactions

Thursday, June 25, 2015 2:30 PM (25 minutes)

Presenter: Prof. DANIELEWICZ, Pawel (Michigan State University, USA)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **367** Type: **Invited Talk - Parallel Session**

Production and spectroscopy of light hypernuclei with heavy ion induced reactions

Thursday, June 25, 2015 2:30 PM (25 minutes)

Presenter: SAITO, Takehiko (GSI, Dramstadt, Germany)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **372** Type: **Invited Talk - Parallel Session**

Study og GDR widths at low temperatrure and lambda spectrometer

Thursday, June 25, 2015 2:30 PM (25 minutes)

Presenter: BANERJEE, S.R. (Variable Energy Cyclotron Centre, Kolkata, India)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **377** Type: **Invited Talk - Parallel Session**

FAZIA applications

Thursday, June 25, 2015 2:30 PM (25 minutes)

Presenter: PIANTELLI, Silvia (INFN,Sezione di Firenze, Italy)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **378** Type: **Invited Talk - Parallel Session**

High-energy ion beams accelerated by intense lasers

Thursday, June 25, 2015 2:55 PM (25 minutes)

Presenter: Prof. BORGHESI, Marco (Queen's University Belfast, Ireland)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **384** Type: **Invited Talk - Parallel Session**

LUNA: present status and future prospects

Presenter: BROGGINI, Carlo (INFN-Padova, Italy)

Track Classification: Nuclear Astrophysics

Contribution ID: **389** Type: **Invited Talk - Parallel Session**

TBA

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **394** Type: **Invited Talk - Parallel Session**

Dynamical description of heavy-ion collisions at Fermi energies

Tuesday, June 23, 2015 2:30 PM (25 minutes)

Presenter: Dr NAPOLITANI, Paolo (IPN Orsay, France)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **400** Type: **Invited Talk - Parallel Session**

Systematics of Elastic and Inelastic Deuteron Breakup

Thursday, June 25, 2015 5:00 PM (25 minutes)

Presenter: Dr CARLSON, Brett (Instituto Tecnológgico de Aeronáutica, São José dos Campos, Brazil)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **409** Type: **Invited Talk - Parallel Session**

Neutron Stars: cosmic laboratories for matter under extreme conditions

Thursday, June 25, 2015 5:00 PM (25 minutes)

Presenter: BOMBACI, Ignazio (Università di Pisa, Italy)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **410** Type: **Invited Talk - Parallel Session**

Clusters in n-rich light nuclei

Thursday, June 25, 2015 5:25 PM (25 minutes)

Presenter: Prof. MILIN, Matko (University of Zagreb, Croatia)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **414** Type: **Invited Talk - Parallel Session**

Description of the fusion-fission reactions in the framework of dinuclear system conception

Thursday, June 25, 2015 5:00 PM (25 minutes)

Presenter: KALANDAROV, Shuhrat (Joint Institute for Nuclear Research, Dubna, Russia)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **419** Type: **Invited Talk - Parallel Session**

Recent results of the nTOF facility

Thursday, June 25, 2015 5:00 PM (25 minutes)

Presenter: TAGLIENTE, Giuseppe (INFN, Bari, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **420** Type: **Invited Talk - Parallel Session**

Constraining the key α-capture astrophysical reaction rates using the sub-Coulomb α-transfer reactions

Thursday, June 25, 2015 5:25 PM (25 minutes)

Presenter: Dr ROGACHEV, Grigory (Florida State University, Usa)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **423** Type: **Oral presentation**

New measurement of the 10B(p,a0)7Be reaction cross section at low energies and the structure of 11C

Thursday, June 25, 2015 6:30 PM (20 minutes)

Presenter: Dr LOMBARDO, Ivano (Università di Napoli Federico II and INFN - Sez. Napoli, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **425** Type: **Invited Talk - Parallel Session**

Highlights of the ISOLDE Facility and the HIE-ISOLDE Project

Thursday, June 25, 2015 5:00 PM (25 minutes)

Presenter: BORGE, Maria J G. (ISOLDE-PH, CERN, Switzeraland)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **426** Type: **Invited Talk - Parallel Session**

The performance of AGATA: from the LNL Demonstrator to the GANIL setup

Thursday, June 25, 2015 5:25 PM (25 minutes)

Presenter: Ms MICHELAGNOLI, Caterina (LNL-INFN, Legnaro, Italy)

Session Classification: New Facilities and Detectors

Track Classification: New Facilities and Detectors

Contribution ID: **430** Type: **Invited Talk - Parallel Session**

A novel approach to the super-heavy elements search

Monday, June 22, 2015 3:15 PM (25 minutes)

Presenter: Dr WIELOCH, Andrzej (Institute of Physics Jagiellonian University, Krakow, Poland)

Session Classification: Heavy and Superheavy Elements

Track Classification: Heavy and Superheavy Elements

Contribution ID: **431** Type: **Invited Talk - Parallel Session**

Upsilon suppression in PbPb collisions at the LHC

Tuesday, June 23, 2015 5:00 PM (25 minutes)

Presenter: WOLSCHIN, Georg (Heidelberg University, Germany)

Session Classification: Relativistic Heavy-Ion Collisions

Track Classification: Relativistic Heavy-Ion Collisions

Contribution ID: **436** Type: **Invited Talk - Parallel Session**

Particle emission at the proton drip-line

Tuesday, June 23, 2015 5:00 PM (25 minutes)

Presenter: PFUTZNER, Marek (University of Warsaw, Poland)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **437** Type: **Invited Talk - Parallel Session**

Nuclear structure studies of neutron-rich nuclei with large gamma-ray spectrometers.

Tuesday, June 23, 2015 5:25 PM (25 minutes)

Presenter: VALIENTE DOBON, Jose' Javier (INFN-LNL, Legnaro, Italy)

Session Classification: Nuclear Structure

Track Classification: Nuclear Structure

Contribution ID: **442** Type: **Invited Talk - Parallel Session**

Transfer and knockout with exotic nuclei

Tuesday, June 23, 2015 5:00 PM (25 minutes)

Presenter: Dr OBERTELLI, Alexandre (CEA Saclay, France)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **443** Type: **Invited Talk - Parallel Session**

Reaction studies with low-energy weakly-bound beams at INFN-LNS

Tuesday, June 23, 2015 5:25 PM (25 minutes)

Presenter: DI PIETRO, Alessia Francesca (INFN-LNS, Catania, italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **448** Type: **Invited Talk - Parallel Session**

Properties of superfluid matter and applications to neutron stars

Presenter: MAGIERSKI, P. (Warsaw University of Technology, Warsaw, Poland)

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **454** Type: **Invited Talk - Parallel Session**

Low-energy fission and beta-delayed fission with radioactive beams

Tuesday, June 23, 2015 2:30 PM (25 minutes)

Presenter: Dr ANDREYEV, Andrei (University of York, UK)

Session Classification: Fusion and Fission

Track Classification: Fusion and Fission

Contribution ID: **460** Type: **Invited Talk - Parallel Session**

Reactions on neutron-deficient nuclei for nuclear astrophysics

Tuesday, June 23, 2015 5:00 PM (25 minutes)

Presenter: BLACKMON, Jeffrey (Louisiana State University, Baton Rouge, USA)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **461** Type: **Invited Talk - Parallel Session**

Nuclear astrophysics with exotic nuclei

Presenter: WOODS, P.

Track Classification: Nuclear Astrophysics

Contribution ID: **467** Type: **Invited Talk - Parallel Session**

The role of the symmetry energy on Pygmy Dipole Resonance dynamics: from schematic models to transport approaches

Monday, June 22, 2015 3:40 PM (25 minutes)

Presenter: Prof. BARAN, Virgil (University of Bucharest, Romania)

Session Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Track Classification: Equation of State of Neutron-Rich Nuclear Matter, Clusters in Nuclei and Nuclear Reactions

Contribution ID: **482** Type: **Invited Talk - Parallel Session**

Indirect techniques for astrophysical reaction rates determinations

Thursday, June 25, 2015 2:30 PM (25 minutes)

Presenter: Dr HAMMACHE, Faïrouz (IPN-Orsay, France)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **489** Type: **Invited Talk - Parallel Session**

The 12C(12C,α)20Ne and 12C(12C,p)23N reactions at the Gamow peak via the Trojan Horse Method

Tuesday, June 23, 2015 5:25 PM (25 minutes)

Presenter: Dr TUMINO, Aurora (INFN-LNS, Catania, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **491** Type: **not specified**

TBA

Contribution ID: **492** Type: **Invited talk - Plenary Session**

Nuclear Reaction studies for Explosive Nuclear Astrophysics

Friday, June 26, 2015 10:00 AM (30 minutes)

Presenter: Prof. WOODS, Philip (Edinburgh University, UK)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics

Contribution ID: **495** Type: **Oral presentation**

Study of cluster structures in 10Be and 16C neutron-rich nuclei via break-up reactions

Thursday, June 25, 2015 6:10 PM (20 minutes)

Presenter: Dr DELL'AQUILA, Daniele (Univ. Napoli Federico II and INFN - Napoli, Italy)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **496** Type: **not specified**

TBA

Contribution ID: **497** Type: **not specified**

TBA

Contribution ID: **498** Type: **Invited Talk - Parallel Session**

Stable and radioactive ION beam studies at ALTO facility

Tuesday, June 23, 2015 2:30 PM (25 minutes)

Presenter: AZAIEZ, Faical (IPN-ORSAY/IN2P3, France)

Session Classification: Reactions and Structure - Unstable Nuclei

Track Classification: Reactions and Structure - Unstable Nuclei

Contribution ID: **499** Type: **Invited Talk - Parallel Session**

LUNA: present status and future prospects

Thursday, June 25, 2015 3:20 PM (25 minutes)

Presenter: CACIOLLI, Antonio (INFN-Padova, Italy)

Session Classification: Nuclear Astrophysics

Track Classification: Nuclear Astrophysics