



The 11<sup>th</sup> International Conference on Clustering Aspects of Nuclear Structure and Dynamics

## CONFERENCE PROGRAMME

Monday 23.05.2016

**9:00 – 10:00 Registration at the Conference Desk**

**10:00 – 10:30 Welcome address**      *G. Trombetti, L. Merola, G. La Rana, P. Cappelletti, E. Vardaci*

### **PLE- Session 1: State of the Art: Experiment (Chair: E. Vardaci)**

10:30 – 11:10    **C. Beck\***      *Recent experimental results on nuclear cluster physics*

11:10 – 11:30    COFFEE BREAK

### **PLE- Session 2: State of the Art: Theory – Part 1 (Chair: H. Horiuchi)**

11:30 – 12:10    **F. Iachello\***      *Recent theoretical results in nuclear cluster physics*

12:10 – 12:35    **R. Bijker**      *Geometric symmetries in light nuclei*

12:35 – 13:00    **M. Sambataro**      *Structure of  $4n$  nuclei in a formalism of quartets*

13:00 – 13:25    **J. Cseh**      *Clustering and quarteting in light nuclei*

13:25 – 15:00    LUNCH

### **PLE-Session 3: Clusters and Nuclear Astrophysics (Chair: A. Tumino)**

15:00 – 15:30    **C. Spitaleri\***      *Clusterization of Light Nuclei and the Trojan Horse Method*

15:30 – 16:00    **P. Descouvemont\***      *Microscopic description of  ${}^6\text{He}$  elastic scattering on heavy targets*

16:00 – 16:25    **T. Kawabata**      *Measurement of the cross section for the  ${}^4\text{He}({}^4\text{He}, n){}^7\text{Be}$  reaction as a possible solution to the cosmological lithium problem*

16:25 – 16:50    **D. Hove**      *Structure and decay at rapid proton capture waiting points*

16:50 – 17:15    COFFEE BREAK



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**PAR-1.A: Parallel Session A (Chair: G. Rogachev)**

- 17:15 – 17:35 R. Smith *Spectroscopy of the Borromean  $^9\text{Be}$  and  $^9\text{B}$  Mirror Nuclei*
- 17:35 – 17:55 T. Furumoto *Study of similarity and dissimilarity between  $^{10}\text{Be}$  and  $^9\text{Li}$  nuclei with microscopic structure and reactions models*
- 17:55 – 18:15 T. Baba *Structure and decay pattern of linear chain states in neutron-rich Carbon isotopes*
- 18:15 – 18:35 D. Dell'Aquila *Study of the cluster structure of  $^{10}\text{Be}$  and  $^{16}\text{C}$  neutron-rich isotopes by means of intermediate energies breakup reactions*

**PAR-1.B: Parallel Session B (Chair: P. Gomes)**

- 17:15 – 17:35 S. Koyama *Cluster structure on neutron rich nuclei  $^{16}\text{C}$*
- 17:35 – 17:55 H. Morita *Proton and Neutron Pair Correlations in  $^{10}\text{B}$*
- 17:55 – 18:15 R.D. Lasserri *Impact of 4-body correlations on clustering*
- 18:15 – 18:35 K. Kravvaris *Microscopic configuration interaction studies of nuclear clustering*

**PAR-1.C: Parallel Session C (Chair: M. La Commara)**

- 17:15 – 17:35 A.V. Afanasjev *High spin structures in the  $A \approx 40$  mass region: from superdeformation to extreme deformation and clusterization*
- 17:35 – 17:55 T. Fukui *Probing surface distribution of  $\alpha$ -cluster in  $^{20}\text{Ne}$  via  $\alpha$ -transfer Reaction*
- 17:55 – 18:15 Y. Kikuchi *Photodisintegration cross section of  $^9\text{Be}$  up to  $E_\gamma = 16$  MeV in the  $\alpha + \alpha + n$  three-body model*
- 18:15 – 18:35 T. Furuno *An active target MAIKo to investigate cluster structures in unstable nuclei*

20:00 – 23:00 **WELCOME COCKTAIL AND CONCERT** (Arcibasilica di S. Giovanni Maggiore a Pignatelli)



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Tuesday 24.05.2016

**PLE-Session 4:  $^{12}\text{C}$ : Experiments and Theory – Part 1 (Chair: W. von Oertzen)**

- 9:00 – 9:30 O. S. Kirsebom\* *Experimental progress on clarifying the excitation spectrum of  $^{12}\text{C}$*
- 9:30 – 10:00 M. Gai\* *Current and Future Tests of the Algebraic Cluster Model in Carbon Isotopes*
- 10:00 – 10:25 M. Tsumura *Search for the rare  $\gamma$ -decay mode in  $^{12}\text{C}$*
- 10:25 – 10:50 T. Suhara  *$\alpha$ -cluster breaking effects on cluster structures in  $^{12}\text{C}$*

10:50 – 11:30 COFFEE BREAK

**PLE-Session 5:  $^{12}\text{C}$ : Experiments and Theory – Part 2 (Chair: R. Lovas)**

- 11:30 – 12:00 J. Draayer\* *No Core Symplectic Model - Exploiting Hidden Symmetry in Atomic Nuclei*
- 12:00 – 12:30 M. Itoh\* *Measurement of the 3- $\alpha$  decay from the Hoyle and the broad 10 MeV states in  $^{12}\text{C}$*
- 12:30 – 12:55 H. Horiuchi *Nonlocalized clustering and evolution of cluster structure in nuclei*
- 12:55 – 13:20 L. Morelli *Clustering effects in fusion evaporation reactions with light even-even  $N=Z$  nuclei*

13:20 – 15:00 LUNCH

**PLE-Session 6: Clusters in Heavy Ion Collisions and Nuclear Matter (Chair: A. Bracco)**

- 15:00 – 15:30 B. Borderie\* *Alpha-particle clustering in Excited alpha-conjugate nuclei*
- 15:30 – 16:00 L. Moretto\* *From the cluster emission to the experimental liquid–vapor phase diagram of bulk, symmetric, uncharged nuclear matter*
- 16:00 – 16:25 S. Typel *A comparison of equation of state models with different cluster dissolution mechanisms*
- 16:25 – 16:50 M. Papa *Effective interaction and cluster production in Nuclear Dynamics*

16:50 – 17:15 COFFEE BREAK



The 11<sup>th</sup> International Conference on Clustering Aspects of Nuclear Structure and Dynamics

**PAR-2.A: Parallel Session A (Chair: I. Lombardo)**

- 17:15 – 17:35 J. Bishop *Searching for  $\alpha$ -gas states in  $^{28}\text{Si}$  with CHIMERA and FARCOS*
- 17:35 – 17:55 L. Quattrocchi *Study of resonances produced in light nuclei through two and multi-particle correlations.*
- 17:55 – 18:15 J. Rodriguez-Sanchez *Fission dynamics at high excitation energies investigated in complete kinematic measurements*
- 18:15 – 18:35 Z.H. Yang *Study on the cluster structure in nuclei by using direct reactions*
- 18:35 – 18:55 L. Francalanza *Projectile's in medium break-up in  $^{36}\text{Ar}+^{58}\text{Ni}$  central collisions*

**PAR-3.B: Parallel Session B (Chair: F. Cappuzzello)**

- 17:15 – 17:35 V.V. Samarin *Microscopic time-dependent description of alpha-cluster transfer and incomplete fusion in reactions with  $^{12}\text{C}$  and  $^{16}\text{O}$  near Coulomb barrier*
- 17:35 – 17:55 D. Carbone *Two-neutron clustering aspects in the transitions induced by the  $^{13}\text{C}(^{18}\text{O}, ^{16}\text{O})^{15}\text{C}$  reaction at 84 MeV incident energy*
- 17:55 – 18:15 H. Masui *Deuteron-Like Correlation for the  $T = 0$  Channel in  $^{18}\text{F}$  Studied within the Continuum Contributions*
- 18:15 – 18:35 E.C. Pinilla *Coulomb breakup of the Borromean nucleus  $^{22}\text{C}$*
- 18:35 – 18:55 Yu. M. Tchuvil'sky *Exchange-Induced Effective Interaction in Cluster Reaction and Decay Channels*

**PAR-4.C: Parallel Session C (Chair: S. Dmitriev)**

- 17:15 – 17:35 M. Odsuren *A Virtual State in a Two-Body System Using the Complex Scaling Method*
- 17:35 – 17:55 B.V. Carlson *A Theoretical Study of Deuteron-induced Surrogate Reactions*
- 17:55 – 18:15 T.V.Chuvil'skaya *Isomeric cross section ratios for the reactions  $^{86(87)}\text{Sr}(\alpha, n(2n))^{89\text{m}}\text{Zr}$*
- 18:15 – 18:35 S. Bailey *Extracting the Spectral Signature of Alpha Clustering in Medium Mass Nuclei*
- 18:35 – 18:55 S. Manna *The effect of clusters on fragment emission mechanism*
- 18:55 – 19:15 B. Gnoffo  *$N/Z$  effects on the reaction mechanisms cross sections in the  $^{78}\text{Kr}+^{40}\text{Ca}$  and  $^{86}\text{Kr}+^{48}\text{Ca}$  collisions at 10 A MeV*

[19:25 – 19:45]: IAC Council for Organization of **Cluster 2020** Conference



The 11<sup>th</sup> International Conference on Clustering Aspects of Nuclear Structure and Dynamics

Wednesday 25.05.2016

**PLE-Session 7: Clusters in Light Nuclei – Part 1 (Chair: M. Fujiwara)**

- 9:00 – 9:30 Tz. Kokalova Wheldon\* *Beautiful clusters*
- 9:30 – 10:00 Y. Funaki\* *Cluster structures in the excited states above the Hoyle state*
- 10:00 – 10:25 H. Yamaguchi *Study on  $\alpha$ -cluster levels in non-4n nuclei using low-energy RI beams*
- 10:25 – 10:50 D. Torresi  *$^{15}\text{O}+\alpha$  resonant elastic scattering to studying cluster states in  $^{19}\text{Ne}$*
- 10:50 – 11:15 COFFEE BREAK

**PLE-Session 8: Clusters and Correlations (Chair: G. Verde)**

- 11:15 – 11:45 S. Shimoura\* *Tetraneutron states populated via  $^4\text{He}(^8\text{He}, ^8\text{Be})$  reaction*
- 11:45 – 12:15 L. Grigorenko\* *High-precision studies of exotic structure and decay effects in the dripline nuclei within three-body core+N+N model*
- 12:15 – 12:40 T. Myo *Tensor correlations in light nuclei with tensor-optimized antisymmetrized molecular dynamics*
- 12:40 – 13:05 W. von Oertzen *Covalent Binding by Neutrons on the Femto-scale*
- 13:05 – 14:45 LUNCH

**PLE-Session 9: State of the Art: Theory – Part 2 (Chair: N. Lo Iudice)**

- 14:45 – 15:15 P. Schuck\* *The  $\alpha$ -particle condensate structure of the Hoyle and analogous states. Where do we stand after 15 years?*
- 15:15 – 15:45 G. Ropke\* *Alpha Decay Width of  $^{212}\text{Po}$  from a quartetting wave function approach*
- 15:45 – 16:15 E. Khan\* *Crystal, cluster and quantum liquid nuclear states*
- 16:15 – 16:40 T. Otsuka *Ab initio Monte Carlo Shell Model calculations on Be and C isotopes*
- 16:40 – 17:00 COFFEE BREAK



The 11<sup>th</sup> International Conference on Clustering Aspects of Nuclear Structure and Dynamics

**PAR-3.A: Parallel Session A (Chair: M. Papa)**

- 17:00 – 17:20 M. Cicerchia *Pre-equilibrium emission and clustering in medium-mass nuclei:  $^{46}\text{Ti}$  from  $^{16}\text{O} + ^{30}\text{Si}$ ,  $^{18}\text{O} + ^{28}\text{Si}$ ,  $^{19}\text{F} + ^{27}\text{Al}$*
- 17:20 – 17:40 R. Ogul *Production of exotic nuclei in heavy ion collisions at Fermi energies*
- 17:40 – 18:00 P. Russotto *Probing the Symmetry Term of the Nuclear Equation of State at High Baryonic Densities*
- 18:00 – 18:20 C. Parascandolo *Evidence of Dynamical Dipole Mode excitation in the  $^{40,48}\text{Ca} + ^{152,144}\text{Sm}$  fusion evaporation and fission reactions at 11MeV/A*

**PAR-3.B: Parallel Session B (Chair: C. Beck)**

- 17:00 – 17:20 S. Watanabe *Four- and three-body breakup mechanism of  $^6\text{Li}$  elastic scattering*
- 17:20 – 17:40 P. Rath *Cluster structure effect of projectile in  $^7\text{Li} + ^{208}\text{Pb}$  reaction*
- 17:40 – 18:00 M. Spieker  *$\alpha$ -clustering and its connection to the E1 response of heavy nuclei*
- 18:00 – 18:20 M. Murata *The measurement of  $^4\text{He}$  Photodisintegration with MAIKo active target*

**PAR-3.C: Parallel Session C (Chair: M. Kimura)**

- 17:00 – 17:20 Y. Chiba *Asymmetric cluster structure and isoscalar monopole/dipole transitions of  $^{28}\text{Si}$*
- 17:20 – 17:40 R. Imai *A new generator coordinate method to describe gas-like states*
- 17:40 – 18:00 G. Lévai *Semimicroscopic algebraic description of  $\alpha$  clustering in Ne isotopes*
- 18:00 – 18:20 A. Solov'yev *Radiative Capture Processes in Multi-Size-Scale Algebraic Version of Resonating Group Model*

**19:45 – 23:00 KEYNOTE TALK AND SOCIAL DINNER (Reale Basilica di S. Chiara ed annesso Monastero)**

19:45 – 20:15 H. Horiuchi\* *An overview of the History of Cluster Conferences*

20:20 – 23:00 All participants *Social dinner at St. Chiara Cloister*



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Thursday 26.05.2016

**PLE-Session 10: Superheavy Nuclei and Cluster Decay (Chair: D. Poenaru)**

- 9:00 – 9:30 M. Itkis\* *Fusion-Fission of superheavy nuclei and clustering phenomena*
- 9:30 – 10:00 N. Carjan\* *Symmetric and Super-Symmetric Spontaneous Fission of Very Heavy Elements: Challenges and Prospects*
- 10:00 – 10:25 D.M. Kamanin *Observation of shape isomer states in fission fragments*
- 10:25 – 10:50 Yu.V. Pyatkov *Collinear cluster tri-partition - the brightest observations and their treating*
- 10:50 – 11:15 COFFEE BREAK

**PLE-Session 11: Clusters in Light Nuclei – Part 2 (Chair: Y. Abe)**

- 11:15 – 11:45 M. Kimura\* *Probing asymmetric clusters by isoscalar monopole/dipole transitions*
- 11:45 – 12:15 G. Rogachev\* *Quantifying clustering near  $\alpha$ -threshold*
- 12:15 – 12:40 S.V. Lukyanov *Some Insights into  $^5\text{He}$ -Cluster Structure of  $^9\text{Be}$*
- 12:40 – 13:05 F. M. Marqués *Exploring the Structure of the Most Neutron-rich Boron and Carbon Isotopes*
- 13:05 – 13:30 M. Ito *Spatial measures of the nuclear reactions*
- 13:30 – 15:30 LUNCH
- 15:30 – 18:00 All participants *Excursion at the Capodimonte Royal Palace*



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Friday 27.05.2016

**PLE-Session 12: Nuclear Molecules (Chair: M. Freer)**

- 9:00 – 9:30 E. Uegaki\* *A Novel Visage of Molecular Resonances in  $^{12}\text{C} + ^{12}\text{C}$*
- 9:30 – 10:00 S. Courtin\* *Experimental investigations of the sub-Coulomb  $^{12}\text{C}+^{12}\text{C}$  and  $^{12}\text{C}+^{16}\text{O}$  reactions*
- 10:00 – 10:25 Y. Taniguchi  *$^{16}\text{O} + ^{16}\text{O}$  molecular structures of superdeformed states in S isotopes*
- 10:25 – 10:50 D. Montanari *Search for highly-excited superdeformed states in  $^{28}\text{Si}$*
- 10:50 – 11:15 COFFEE BREAK

**PLE-Session 13: State of the Art: Theory – Part 3 (Chair: S. Typel)**

- 11:15 – 11:45 W. Horiuchi\* *Alpha-clustering near nuclear surface and harmonic-oscillator excitations*
- 11:45 – 12:10 R. Lovas *Preformation of alpha clusters in alpha decay*
- 12:10 – 12:35 G. Royer *Alpha clustering and nuclear molecules in  $^8\text{Be}$ ,  $^{12}\text{C}$ ,  $^{16}\text{O}$ ,  $^{20}\text{Ne}$ ,  $^{24}\text{Mg}$ , and  $^{32}\text{S}$*
- 12:35 – 13:00 M. S. Hussein *Theories of Inclusive Non-Elastic Breakup and Incomplete Fusion of Weakly-Bound Two-Cluster Projectiles Revisited: Critical Assessment*
- 13:00 – 15:00 LUNCH

**PLE-Session 14: Cluster Effects in Nuclear Reactions and Decay (Chair: M. S. Hussein)**

- 15:00 – 15:25 P.R.S. Gomes *Breakup of the weakly bound  $^{6,7}\text{Li}$  two-cluster nuclei at near barrier energies*
- 15:25 – 15:50 A.A. Cowley *Influence of Nuclear Cluster Structure in Proton-Induced Pre-Equilibrium Composite Particle Emission*

**PLE-Session 15: Summary and Conclusions (Chair: D. Baye)**

- 15:50 – 16:30 Y. Kanada En'yo\* *Closing Remarks: Theoretical Perspectives*
- 16:30 – 17:10 M. Freer\* *Closing Remarks: Experimental Perspectives*
- 17:10 E. Vardaci, I. Lombardo *Closing Remarks and Acknowledgments*