

**ISU2015
 Quest for visible
and invisible strange stuff in
the Universe**

Report of Contributions

Contribution ID: 0

Type: **not specified**

Welcome

Friday, November 27, 2015 9:30 AM (15 minutes)

Presenters: Dr CURCEANU, Catalina Oana (LNF); Mr PISCICCHIA, Kristian (LNF)

Session Classification: Session I

Contribution ID: 1

Type: **not specified**

Exotic atoms to understand the stars

Friday, November 27, 2015 9:45 AM (30 minutes)

Presenter: Dr CURCEANU, Catalina Oana (LNF)

Session Classification: Session I

Contribution ID: 2

Type: **not specified**

A model for spheroidal galaxies with prevalence of radial component in the velocity distributions of stars

Friday, November 27, 2015 10:15 AM (15 minutes)

Presenter: Dr CAMPION, Stefano (Universita' La Sapienza, Roma)

Session Classification: Session I

Contribution ID: 3

Type: **not specified**

Macro dark matter selfgravitating halos around galaxies

Friday, November 27, 2015 10:30 AM (30 minutes)

A new family of nonrelativistic, Newtonian non quantum equilibrium configurations describing galactic halos is introduced taking into account a new possibility to identify particles with masses larger than 1 GeV as components of the dark matter. This possibility may have important implications on the formation of very massive particles during the big bang. The obtained results are in accordance with the requested values in mass and radius consistent with the rotation velocity curve observed in the Galaxy.

Presenter: Prof. MERAFINA, Marco (University of Rome La Sapienza)

Session Classification: Session I

Contribution ID: 4

Type: **not specified**

Astrophysical constraints of axion-photon coupling

Friday, November 27, 2015 11:30 AM (30 minutes)

Presenter: STRANIERO, Oscar (N)

Session Classification: Session II

Contribution ID: 5

Type: **not specified**

The Dynamical Evolution of a Galaxy Cluster: the Local Effect of Dark Energy

Friday, November 27, 2015 12:00 PM (30 minutes)

The role of Dark Energy (DE) in the long term evolution of galaxy clusters is the main topic of this talk. Recently, observational data of the outflow of galaxies in the Virgo cluster, suggest that DE can also act on a small cosmic scales, like a single galaxy cluster. By means of direct N-body we performed several simulations in which a galaxy cluster is undergo to the action of the DE force and the gravitational one induced by the gas. With our work we reproduced the so called Hubble diagram, with the aim to highlight the outflow of the galaxies lying in the outermost region of the cluster. By comparing the different simulations, our preliminary results suggest that the observed outflow of galaxies is likely due to the local effect of DE.

Presenter: Dr DONNARI, Martina (Università di Roma "Sapienza")

Session Classification: Session II

Contribution ID: 6

Type: **not specified**

Strangeness production in pion induced reactions at HADES

Friday, November 27, 2015 12:30 PM (30 minutes)

Presenter: SCORDO, Alessandro (LNF)

Session Classification: Session II

Contribution ID: 7

Type: **not specified**

Road to CTA: the Quest for Dark Matter with Cherenkov Telescopes

Friday, November 27, 2015 1:00 PM (30 minutes)

Arrays of Cherenkov telescopes constitute the instrumental frontier for the ground-based gamma-ray astronomy. Their activity has presently led to great improvements in high-energy imaging and source discovery, also providing new tools to study cosmic rays, photon propagation in the Universe and dark matter (DM). In particular, the indirect search for DM through the detection of gamma rays produced by DM self-interaction in astrophysical objects (the Milky Way halo, dwarf spheroidal galaxies, nearby galaxy clusters) is one of the major research topics which will be exploited by the future Cherenkov Telescope Array (CTA). With a sensitivity ~ 10 times better than current Cherenkov instruments, a large field of view, a small angular resolution and a covered energy range up to ~ 100 TeV, CTA should be able to detect gamma-ray emission from annihilation of DM particles with mass between ~ 0.1 and ~ 10 TeV in the Milky Way center at the “natural-scale” DM cross section; for less contaminated candidates, such as dwarf spheroidal galaxies (dSphs), more reliable estimates of their DM content, based on large sets of photometric and kinematic data of their stellar members, must be computed in order to accept or remove them as potential targets for future CTA observations.

Presenter: Dr SATURNI, Francesco Gabriele (Dip. di Fisica - Universita' degli Studi di Roma "La Sapienza")

Session Classification: Session II

Contribution ID: 8

Type: **not specified**

Measurements of NN correlations in nuclei

Friday, November 27, 2015 2:30 PM (30 minutes)

The structure of nuclei can be well described by independent particle models assuming movement of nucleons in nuclear mean field. However, some basic properties of nuclei such as nuclear binding energies cannot be reproduced without introduction of mechanisms beyond this assumption, such as nucleon-nucleon correlations. The same phenomena are responsible for the existence of the nuclear states above Fermi level and appearance of large nucleon momenta in nuclei. Investigations of pp and pn correlations can also contribute to the understanding of cold dense nuclear systems such as neutron stars. These correlations have been subjects of intensive experimental and theoretical research using different reactions, and electromagnetically induced two-nucleon knockout reactions are considered as a very powerful investigative tool. In this talk an overview of recent investigations of nucleon-nucleon correlations in electron scattering experiments will be given and results obtained at Mainz Microtron (MAMI) will be presented.

Presenter: Prof. BOSNAR, Damir (Department of Physics, Faculty of Science, University of Zagreb)

Session Classification: Session III

Contribution ID: 9

Type: **not specified**

Search for kaons 2/3 nucleon absorption and hyperon-nucleon scattering cross section by AMADEUS

Friday, November 27, 2015 3:00 PM (30 minutes)

Presenter: Dr DEL GRANDE, Raffaele (LNF-INFN)

Session Classification: Session III

Contribution ID: 10

Type: **not specified**

Investigation of the low-energy kaons hadronic interactions in light nuclei by AMADEUS

Friday, November 27, 2015 3:30 PM (30 minutes)

The AMADEUS experiment deals with the investigation of the low-energy kaon-nuclei hadronic interaction at the DAΦNE collider at LNF-INFN, trying to answer pending questions in the non-perturbative strangeness QCD sector. AMADEUS step 0 consisted in the reanalysis of 2004/2005 KLOE data, exploiting K^- absorptions in H, ^4He , ^9Be and ^{12}C , leading to the first invariant mass spectroscopy study with very low momentum (100MeV) in-flight K^- captures.

The results obtained in the analyses of the hyperon-pion correlated events, searching for the resonant shapes of Y^* states, and the analyses of hyperon-deuteron, and triton correlations, leading to the first measurement of the K^- 4NA cross section (for $p_k=100\text{MeV}/c$) will be presented. The preliminary measurement of the $K^-p \rightarrow \Sigma^0\pi^0$ cross section (for $p_k=100\text{MeV}/c$) will be also shown.

Presenter: Mr PISCICCHIA, Kristian (LNF)

Session Classification: Session III

Contribution ID: 11

Type: **not specified**

The properties of nuclear matter using chiral interactions

Friday, November 27, 2015 4:30 PM (30 minutes)

We calculate the energy per particle of symmetric nuclear matter and pure neutron matter using the many Brueckner-Hartree-Fock approach and employing the Chiral Next-to-next-to next-to leading order (N3LO) nucleon-nucleon (NN) potential, supplemented with various parametrizations of the Chiral Next-to-next-to leading order (N2LO) three-nucleon force. Such combination is able to reproduce several observables of the physics of light nuclei for suitable choices of the parameters entering in the three-nucleon interaction. We find that some of these parametrizations, provide also reasonable values for the observables of nuclear matter at the saturation point.

Presenter: LOGOTETA, Domenico (PI)

Session Classification: Session VI

Contribution ID: 12

Type: **not specified**

Quark deconfinement and the duration of short Gamma Ray Bursts

Friday, November 27, 2015 5:00 PM (30 minutes)

We propose a model for short duration gamma-ray bursts (sGRBs) based on the formation of a quark star after the merger of two neutron stars. We assume that the sGRB central engine is a proto-magnetar, which has been previously invoked to explain the plateau-like X-ray emission observed following both long and short GRBs. Here, we show that: i) a few milliseconds after the merger it is possible to form a stable and massive star made in part of quarks; ii) during the early cooling phase of the incompletely formed quark star, the flux of baryons ablated from the surface by neutrinos is large and it does not allow the outflow to achieve a bulk Lorentz factor high enough to produce a GRB; iii) after the quark burning front reaches the stellar surface, baryon ablation ceases and the jet becomes too baryon poor to produce a GRB; iv) however, between these two phases a GRB can be produced over the finite timescale required for the baryon pollution to cease; a characteristic timescale of the order of 0.1 s naturally results from the time the conversion front needs to cover the distance between the rotational pole and the latitude of the last closed magnetic field line; v) we predict a correlation between the luminosity of the sGRB and its duration, consistent with the data; vi) our model also predicts a delay of the order of ten seconds between the time of the merger event and the sGRB, allowing for the possibility of precursor emission and implying that the jet will encounter the dense cocoon formed immediately after the merger.

Presenter: DRAGO, Alessandro (FE)

Session Classification: Session VI

Contribution ID: 13

Type: **not specified**

Discussion

Friday, November 27, 2015 5:30 PM (1 hour)

Session Classification: Session VI