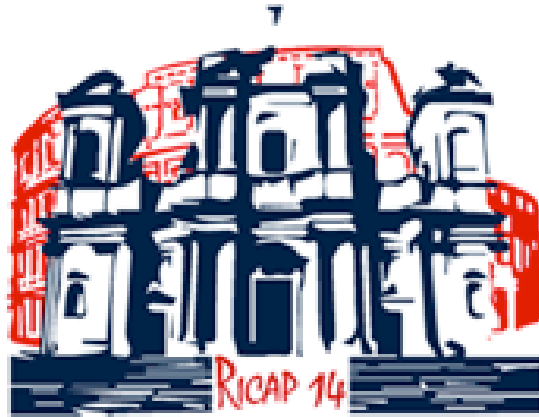


RICAP-14, Noto (Sicily, Italy) September 30th- October 3rd



Report of Contributions

Contribution ID: 95

Type: **oral**

Short Distance Neutrino Oscillations with Borexino

Tuesday, 30 September 2014 16:15 (20 minutes)

The Borexino detector has convincingly shown its outstanding performances in the in the low energy, sub-MeV regime through its unprecedented accomplishments in the solar and geo neutrinos detection. These performances make it the ideal tool to accomplish a state-of-the-art experiment able to test unambiguously the long-standing issue of the existence of a sterile neutrino, as suggested by the several anomalous results accumulated over the past two decades, i.e. the outputs of the LSND and Miniboone experiments, the results of the source calibration of the two Gallium solar neutrino experiments, and the recently hinted reactor anomaly.

The SOX project will exploit two sources, based on Chromium and Cerium, respectively, which deployed under the experiment, in a location foreseen on purpose at the time of the construction of the detector, will emit two intense beams of neutrinos (Cr) and anti-neutrinos (Ce). Interacting in the active volume of the liquid scintillator, each beam would create an unmistakable spatial wave pattern in case of oscillation of the ν_e (or anti ν_e) into the sterile state: such a pattern would be the smoking gun proving the existence of the new sterile member of the neutrino family. Otherwise, its absence will allow setting very stringent limit on its existence.

The talk will outline the project and discuss in detail the sensitivity of both Cerium and Chromium measurements.

Primary author: BOREXINO, Collaboration (LNGS)

Presenter: Dr CAMINATA, Alessio (INFN - Genova)

Session Classification: Parallel Session C

Contribution ID: 97

Type: **poster**

Nu-Forces at Work in IceCube

Tuesday, 30 September 2014 15:00 (20 minutes)

The IceCube experiment has recently detected the highest-energy neutrino events yet recorded. This data is remarkable both for the significant excess of neutrino events above known backgrounds, and also for the conspicuous lack of events both above and below 1 PeV. I'll discuss a simple model of neutrino self-interactions mediated by a MeV-scale boson that can account for these peculiar features of the IceCube spectrum. The cosmology of neutrino in this scenario is quite distinct and if this mediator also interacts with dark matter, it can alleviate long-standing tension with the observed abundances and internal structure of dwarf galaxies.

Primary author: SHOEMAKER, Ian (CP3-Origins, University of Southern Denmark)

Presenter: SHOEMAKER, Ian (CP3-Origins, University of Southern Denmark)

Session Classification: Parallel Session A

Contribution ID: 98

Type: **poster**

Can Neutrino Help Us To See Dark Matter ?

Tuesday, 30 September 2014 17:15 (20 minutes)

Based on our understanding of the extended theory of relativity, the dark matter could have a new exotic spin structure. Understanding the role of spin in the expanded theory of relativity can be paramount in solving some significant problems of the particle physics as well as in the formation of the visible part of the universe. We consider how in the ternary neutrino model (GV-2006-2014) appears the possibility of opening the new spin structure phenomena that we can associate with specific spinor properties of dark matter. It will be discussed some mathematical ways of finding such spaces admitted the unusual spin structure. We plan consider some phenomenological consequences of our approach.

Primary author: Prof. VOLKOV, Gennadii (PNPI -Kurchatov Nuclear Centre)

Presenter: Prof. VOLKOV, Gennadii (PNPI -Kurchatov Nuclear Centre)

Session Classification: Parallel Session D

Contribution ID: **100**Type: **not specified**

Borexino: recent solar and terrestrial neutrino results

Tuesday, 30 September 2014 11:50 (35 minutes)

The first phase of the Borexino experiment, currently running at the Laboratori del Gran Sasso in Italy, has been completed in 2010, and after a successful purification campaign which have further brought down the background levels, a second data taking phase is now in progress, started in October 2011.

In this talk, after recalling the main features of the detector, the final results of Phase 1 will be summarized, as well as the first outcomes of Phase 2, namely: a new measurement of the geoneutrino flux, the detection of the imprinting of the annual modulation in the solar neutrino signal, the full understanding of the cosmogenic backgrounds and the recent limits on heavy sterile neutrino mixing in 8B decay. Moreover, the full perspectives for solar neutrinos with the whole amount of data planned to be taken in Phase 2 will be given, emphasizing the unique possibility of Borexino to cover at the end of its program the entire solar neutrino spectrum, including the two important and challenging still missing pieces represented by pp and CNO neutrinos.

Primary author: BOREXINO, Collaboration (LNGS)

Presenter: PALLAVICINI, Marco (GE)

Session Classification: II Plenary Session

Contribution ID: **101**Type: **not specified**

Galactic sources of high energy neutrinos

Wednesday, 1 October 2014 15:00 (20 minutes)

The recent results from ground based gamma-ray detectors (HESS, MAGIC, VERITAS) provides a population of TeV galactic gamma-ray sources which are potential sources of high energy neutrinos. Since the gamma-rays and neutrinos are produced from decays of neutral and charged pions, the flux of TeV gamma-rays can be used to estimate the upper limit of neutrino flux and vice versa; detectability of neutrino flux implies a minimum flux of the accompanying gamma-rays (assuming internal and external absorption of gamma-rays is negligible). Using this minimum flux it is possible to find the sources which can be detected with cubic-kilometer telescopes. I will discuss possibility to detect high energy neutrinos from powerful galactic accelerators, such as Supernova Remnants (SNRs) and Pulsar Wind Nebulae (PWNe) and show that likely only two sources (RX J1713.7-3946 and RX J0852.0-4622) will be detected by current generation of instruments (IceCube and Km3Net). It will be shown also that galactic binary systems could be promising sources of high energy neutrinos. In particular, neutrinos and gamma-rays from Cygnus X-3 during recent gamma-ray activity will be discussed, showing that in the future such kind of activities could produce detectable flux of neutrinos.

Primary author: Dr SAHAKYAN, Narek (National Academy of Sciences of the Republic of Armenia and ICRA Net)

Presenter: Dr SAHAKYAN, Narek (National Academy of Sciences of the Republic of Armenia and ICRA Net)

Session Classification: Parallel Session E

Contribution ID: **102**Type: **not specified**

Latest results from the Pierre Auger Observatory

Wednesday, 1 October 2014 11:50 (35 minutes)

The Pierre Auger Observatory has been designed to investigate the origin and nature of Ultra High Energy Cosmic rays with energies from 10^{17} to 10^{20} eV. In this paper we will review some of the most recent results obtained from data of the Pierre Auger Observatory, namely the spectrum of cosmic rays, the anisotropies in arrival directions and the studies related to mass composition and to the number of muons measured at ground. We will also discuss the implication of these results for assembling a consistent description of the composition, origin and propagation of cosmic rays.

Primary author: Mrs LHENRY-YVON, iIsabelle (Institut de Physique Nucléaire d'Orsay)

Presenter: Mrs LHENRY-YVON, iIsabelle (Institut de Physique Nucléaire d'Orsay)

Session Classification: Plenary Session 4th

Contribution ID: 103

Type: **not specified**

Ultra-high energy cosmic rays: where do we stand 50 years after their first detection?

Tuesday, 30 September 2014 12:25 (35 minutes)

Ultra-high energy cosmic rays (UHECR, $E > 10^{18}$ eV) can be studied only through the giant air-showers they produce in atmosphere. First UHECRs were detected 50 years ago by the pioneering Volcano Ranch air-shower array. Since then, many more UHECR data have been collected, by larger and higher quality experiments that have followed each other in half a century. We make a retrospective survey of the technical progress that has led to the construction of the two largest UHECR experiments in the world, the Telescope Array and the Pierre Auger Observatory, whose data currently dominate from the Northern and Southern hemispheres, respectively. We review the results of their measurements on the UHECR energy spectrum, primary composition and distribution of arrival directions. While important advances in understanding UHECR have been made in 50 years, new challenging questions have been opened too. We discuss the perspectives for answering them in the future.

Primary author: GHIA, Piera Luisa (LPNHE-CNRS, Paris)

Presenter: GHIA, Piera Luisa (LPNHE-CNRS, Paris)

Session Classification: II Plenary Session

Contribution ID: **104**Type: **poster**

The ASTRI/CTA SST mini-array, a seed of the future Cherenkov Telescope Array

Thursday, 2 October 2014 15:00 (20 minutes)

The Cherenkov Telescope Array (CTA) is a large collaborative effort aimed at the design and operation of an observatory dedicated to the very high-energy gamma-ray astrophysics in the energy range 30 GeV - 100 TeV, which will yield about an order of magnitude improvement in the sensitivity with respect to the current major arrays (H.E.S.S., MAGIC, and VERITAS). Within this framework, the Italian National Institute for Astrophysics is leading the ASTRI project, whose main goals are the design and installation on Mt. Etna (Sicily) of an end-to-end dual-mirror prototype of the CTA small size telescope (SST) and the displacement at the CTA Southern site of a dual-mirror SST mini-array composed by seven units with a relative distance of about 300 m. The innovative dual-mirror Schwarzschild-Couder optical solution adopted for the ASTRI Project allows us to substantially reduce the telescope plate-scale and, thus, to adopt silicon photo-multipliers as light-detectors.

The ASTRI/CTA SST mini-array is a wider international effort. The mini-array is sensitive in the energy range 1 - 100 TeV, with angular resolution of a few arcmin and energy resolution of about 10-15%, is well suited to study relatively bright sources (a few $\times 10^{-12}$ erg/cm²/s at 10 TeV) at very high energy.

Prominent sources such as extreme blazars, nearby well-known BL Lac objects, Galactic pulsar wind nebulae supernovae remnants, micro-quasars, and the Galactic Center can be observed in a previously unexplored energy range.

The ASTRI/CTA SST mini-array will extend the current IACTs sensitivity well above a few tens of TeV and, at the same time, will allow us to compare our results on a few selected targets with those of current (HAWC) and future high-altitude extensive air-shower detectors.

Primary author: Dr VERCELLONE, Stefano (INAF/IASF Palermo)

Co-authors: ASTRI, Collaboration (<http://www.brera.inaf.it/astri/>); CTA, Consortium (<http://www.cta-observatory.org/>)

Presenter: Dr VERCELLONE, Stefano (INAF/IASF Palermo)

Session Classification: Parallel Session I

Contribution ID: **105**Type: **oral**

ANTARES and Baikal: recent results from underwater neutrino telescopes

Wednesday, 1 October 2014 10:10 (35 minutes)

Two Northern hemisphere neutrino telescopes are currently searching for astrophysical neutrinos in the TeV/PeV range: ANTARES and Baikal. Both observatories utilize various signatures like a high energy excess over the atmospheric neutrino flux, searches for localized neutrino sources of various extensions and multi-messenger analyses based on time and/or space coincidences with other cosmic probes. In this contribution we will review the status of both experiments and discuss the most recent results.

Primary author: Dr SCHÜSSLER, Fabian (Irfu, CEA-Saclay)

Presenter: Dr SCHÜSSLER, Fabian (Irfu, CEA-Saclay)

Session Classification: III Plenary Session

Contribution ID: **106**Type: **oral**

DarkSide-50

Tuesday, 30 September 2014 16:35 (20 minutes)

DarkSide-50 (DS-50) at Gran Sasso underground laboratory, Italy, is a direct dark matter search experiment based on a TPC with liquid argon from underground sources. The DS-50 TPC, with 50 kg of active argon and a projected fiducial mass of >33 kg, is installed inside an active neutron veto based on a boron-loaded organic scintillator. The neutron veto is built inside a water cherenkov muon veto. DS-50 has been taking data since Nov 2013, collecting more than $2e7$ events with atmospheric argon. This data represents an exposure to the largest background, beta decays of Ar-39, comparable to the full three-year run planned for DS-50 with underground argon. When analyzed with a threshold that would give a sensitivity in the full run of about $1e-45 \text{ cm}^2$ at a WIMP mass of $100 \text{ GeV}/c^2$, there is no Ar-39 background observed. The detector design and performance will be presented as well as results from the atmospheric argon run still in progress.

Primary author: Dr RAZETO, Alessandro (LNGS)

Presenter: ROSSI, Biagio (NA)

Session Classification: Parallel Session D

Contribution ID: 107

Type: oral

Discovery of TeV gamma-ray emission from the pulsar wind nebula 3C 58 by MAGIC

Wednesday, 1 October 2014 14:00 (30 minutes)

The pulsar wind nebula (PWN) 3C 58 is one of the historical very-high-energy (VHE; $E > 100$ GeV) gamma-ray source candidates.

It is energized by one of the highest spin-down power pulsars known (5% of Crab pulsar) and it has been compared to the Crab Nebula due to their morphological similarities. This object was previously observed by imaging atmospheric Cherenkov telescopes (Whipple, VERITAS and MAGIC), although not detected, with an upper limit of 2.4% Crab Unit (C.U.) at VHE. It was detected by Fermi-LAT with a spectrum extending beyond 100 GeV.

We analyzed 81 hours of 3C 58 data taken with the MAGIC telescopes and we detected VHE gamma-ray emission with a significance of 5.7 sigma and an integral flux of 0.65% C.U. above 1 TeV. The differential energy spectrum between 400 GeV and 10 TeV is well described by a power-law function $d\phi/dE = f_0 / (1 \text{ TeV})^{-\Gamma}$ with $f_0 = (2.0 \pm 0.4_{\text{stat}} \pm 0.6_{\text{sys}}) \times 10^{-13} \text{ cm}^{-2} \text{ s}^{-1} \text{ TeV}^{-1}$ and $\Gamma = 2.4 \pm 0.2_{\text{stat}} \pm 0.2_{\text{sys}}$. The skymap is compatible with an unresolved source. We report the first significant detection of PWN 3C 58 at TeV energies. According to our results 3C 58 is the least luminous VHE gamma-ray PWN ever detected at VHE and the one with the lowest flux at VHE to date. We compare our results with the expectations of time-dependent models in which electrons up-scatter photon fields. The best representation favors a distance to the PWN of 2 kpc and Far Infrared (FIR) comparable to CMB photon fields. If we consider an unexpectedly high FIR density, the data can also be reproduced by models assuming a 3.2 kpc distance. A low magnetic field, far from equipartition, is required to explain the VHE data. Hadronic contribution from the hosting supernova remnant (SNR) requires unrealistic energy budget given the density of the medium, disfavoring cosmic ray acceleration in the SNR as origin of the VHE gamma-ray emission.

Primary author: Mr RUBÉN, López-Coto (IFAE)

Presenter: Mr RUBÉN, López-Coto (IFAE)

Session Classification: Parallel Session F

Contribution ID: **108**Type: **not specified**

The NOvA Experiment at Fermilab

Tuesday, 30 September 2014 16:35 (20 minutes)

The NOvA Experiment at Fermilab is a long baseline accelerator neutrino experiment designed to measure neutrino flavor oscillations. The NOvA detectors began commissioning and collecting initial data in November 2011 and completed construction in July 2014. The experiment features a highly segmented, “totally active”, 14 kT Far Detector optimized for the detection of ν_e interactions and their resultant electromagnetic showers. The far detector’s unique streaming readout, combined with a data-driven triggering system, allow it to access a wide array of other physics, including cosmic ray measurements. The NOvA detector is capable of the detection, reconstruction and measurement of high multiplicity cosmic-ray showers and cosmic ray induced events with an exposure rate unprecedented for tracking calorimeters of this scale. In addition, the experiment’s full data stream is buffered by the data acquisition systems, providing an exceedingly long, 30 minute deep, trigger decision window, allowing the experiment to participate in the Super Nova Early Warning System (SNEWS) effort to study the neutrino signal from any nearby supernova that occur during the experiment’s lifespan.

Primary author: Mr FLUMERFELT, Eric (University of Tennessee)

Presenter: Mr FLUMERFELT, Eric (University of Tennessee)

Session Classification: Parallel Session C

Contribution ID: **109**Type: **poster**

Neutrino and Muon Energy Reconstruction for KM3NeT

Tuesday, 30 September 2014 14:20 (20 minutes)

KM3NeT is a European deep-sea research infrastructure that will host a neutrino telescope with a volume of several cubic kilometers at the bottom of the Mediterranean Sea. The telescope will search for galactic and extragalactic neutrinos from distant astrophysical sources like gamma ray bursts, super-novae or colliding stars. The analyses performed in large ice and water Cherenkov detectors rely upon the reconstruction of the muon direction and energy, and consequently, those of the neutrino. The estimation of the muon energy is also critical for the differentiation of muons from neutrinos originating from astrophysical sources from muons and neutrinos that have been generated in the atmosphere and constitute the detector's background. The energy is derived from the detection of the Cherenkov light produced by the muons that are created during the charged current interactions of neutrinos in or in the vicinity of the detector.

We describe a method to determine the muon and neutrino energy employing a Neural Network. An energy resolution of about 0.3 has been achieved for muons at the TeV range.

Primary author: DRAKOPOULOU, Evangelia (N.C.S.R. Demokritos)

Presenter: DRAKOPOULOU, Evangelia (N.C.S.R. Demokritos)

Session Classification: Parallel Session A

Contribution ID: 110

Type: **not specified**

Constraints to a Galactic component of the Ice Cube cosmic neutrino flux

Wednesday, 1 October 2014 14:20 (20 minutes)

The IceCube evidence for cosmic neutrinos in the high-energy starting events (HESE) sample has suggested a large number of hypothesis for their origin. The fact that most of HESE are downward going suggests a possible Galactic origin for a fraction of the signal.

The hypothesis of a Galactic component of the IceCube signal, either considering a cluster of events from a single point-like source, or considering a directional excess from an extended Galactic region, are reviewed and constrained from the present available upper limits from the ANTARES neutrino telescope.

ANTARES, located in the Northern hemisphere, has for the ν_μ flavor an effective area larger than that of IceCube for $E_\nu < 60$ TeV and a factor of ~ 2 smaller at 1 PeV, independently of the neutrino flavor, for sources in the Southern sky.

In addition, the use of the ν_μ channel allows an accurate measurement (at the level of 0.5°) of the incoming neutrino direction.

The IceCube possible signal and the ANTARES limits, using the published effective areas, are studied in terms of a power law flux $E^{-\Gamma}$, with spectral index Γ ranging from 2.0 to 2.5 to cover most astrophysical models.

The perspectives for the imminent Phase-1 of the KM3NeT Neutrino telescope in the Mediterranean Sea are also considered.

Primary author: SPURIO, Maurizio (BO)

Presenter: SPURIO, Maurizio (BO)

Session Classification: Parallel Session E

Contribution ID: 111

Type: **oral**

Precision Cosmic Ray Physics with Space-born Experiments

Tuesday, 30 September 2014 11:10 (40 minutes)

After more than 100 years after their discoveries, cosmic rays have been extensively studied, both with balloon experiments and with ground observatories.

More recently, the possibility of mounting detectors on satellites or on the International Space Station has allowed for a long duration (several years) continuous observation of primary cosmic rays,

i.e. before their interaction with the earth atmosphere, thus opening a new regime of precision measurements.

In this review, recent results from major space experiments, as

Pamela, AMS02 and Fermi, as well as next generation experiments proposed for the International Space Station, for standalone satellites or for the yet to come Chinese Space Station, will be presented.

The impact of these experiment on the knowledge of Cosmic Ray propagation will also be discussed.

Primary author: INCAGLI, Marco (PI)

Presenter: INCAGLI, Marco (PI)

Session Classification: II Plenary Session

Contribution ID: 112

Type: **not specified**

Analysis of the cumulative neutrino flux from FERMI-LAT blazar populations using 3 years of IceCube data

Wednesday, 1 October 2014 14:00 (20 minutes)

The recent discovery of a diffuse neutrino flux around PeV energies raises the question which populations of astrophysical sources contribute to this diffuse signal. One extragalactic candidate source population to produce high-energy neutrinos are Blazars.

We present results from a likelihood analysis searching for cumulative neutrino emission from Blazar populations selected with the 2nd FERMI-LAT AGN catalogue (2LAC) using an IceCube data set that has been optimized for the detection of individual sources. In contrast to previous searches with IceCube, the investigated populations contain up to hundreds of sources, the biggest one being the entire Blazar sample measured by the Fermi-LAT. No significant neutrino signal was found from any of these populations. Some implications of this non-observation for the origin of the observed PeV diffuse signal will be discussed.

Primary author: Mr GLÜSENKAMP, Thorsten (DESY)

Co-author: Dr ACKERMANN, Markus (DESY)

Presenter: Mr GLÜSENKAMP, Thorsten (DESY)

Session Classification: Parallel Session E

Contribution ID: 113

Type: **oral**

The Cosmic Ray light component spectrum in the 10-1000 TeV energy range measured by the ARGO-YBJ experiment by using a bayesian approach

Wednesday, 1 October 2014 17:00 (20 minutes)

The ARGO-YBJ experiment is a full coverage air shower detector operated at the Yangbajing international cosmic ray observatory. The detector has been in stable data taking in its full configuration since November 2007 to February 2013. The high altitude and the high segmentation and spacetime resolution offer the possibility to explore the cosmic ray energy spectrum in a very wide range, from a few TeV up to 5000 TeV. The high segmentation allows a detailed measurement of the lateral distribution, which can be used in order to discriminate showers produced by light and heavy elements. In this work we present the measurement of the cosmic ray light component spectrum in the energy range 10-1000 TeV. The analysis has been carried out by using a two-dimensional unfolding method based on the bayes theorem.

Primary authors: MONTINI, Paolo (ROMA3); MARI, Stefano Maria (ROMA3)

Co-author: COLLABORATION, ARGO-YBJ (ARGO-YBJ Collaboration)

Presenter: MONTINI, Paolo (ROMA3)

Session Classification: Parallel Session H

Contribution ID: 114

Type: **oral**

Indirect Dark Matter Searches with VERITAS

Tuesday, 30 September 2014 15:00 (20 minutes)

The standard model of cosmology requires dark matter (DM) to account for the 83% of the total mass density of the Universe. Assuming that the DM is composed of self-annihilating weakly interacting massive particles (WIMPs), its nature could be unraveled through the detection of the annihilation products, including photons with energies up to the WIMP mass. Annihilation of WIMPs with masses larger than 50 GeV could therefore produce very high energy gamma rays, potentially detectable by ground-based gamma-ray telescopes like VERITAS. We report on the VERITAS DM Program, an extensive set of observations of well motivated targets for indirect DM detection: dwarf spheroidal galaxies orbiting the Milky Way, the Galactic Center, galactic DM subhalo candidates amongst unassociated Fermi-LAT sources. We present VERITAS exclusion regions obtained on the thermally averaged annihilation cross section of the WIMP derived from these observations, and elaborate on the searches for DM subhalo candidates in the gamma-ray band.

Primary author: Dr NIETO CASTANO, Daniel (Columbia University)

Co-author: FOR THE VERITAS COLLABORATION, - (-)

Presenter: Dr NIETO CASTANO, Daniel (Columbia University)

Session Classification: Parallel Session B

Contribution ID: 115

Type: **poster**

Following Up Gravitational Wave Transients with the Cherenkov Telescope Array

Tuesday, 30 September 2014 18:30 (20 minutes)

Detections of the electromagnetic counterparts to gravitational wave (GW) observations will be critical to understanding the astrophysical phenomena involved. However, in many cases –especially early in the advanced LIGO/Virgo era –the localization of GW transients will be poor, and follow-up observations will be required to rapidly search 100 –1000 square degrees of the sky. Relatively few telescopes are capable of such searches with the required sensitivity. We show that the Cherenkov Telescope Array (CTA) has the sensitivity needed to detect short gamma-ray bursts (GRBs) over the detection range of advanced LIGO/Virgo (hundreds of megaparsecs); short GRBs are thought to originate in compact-binary mergers, which are also considered to likely be the first class of sources detected in GWs. Thus, CTA can make an invaluable contribution to understanding the first GW detections.

Primary author: Dr NIETO CASTANO, Daniel (Columbia University)

Co-authors: Prof. HUMENSKY, Brian (Columbia University); Dr BARTOS, Imre (Columbia University); Prof. OSBORNE, Julian (University of Leicester); Dr HURLEY, Kevin (Space Sciences Laboratory, University of California-Berkeley); Prof. PAUL, O'Brien (University of Leicester); Prof. MÉSZÁROS, Peter (Pennsylvania State University); Dr VERES, Péter (Pennsylvania State University & George Washington University); Prof. MUKHERJEE, Reshmi (Barnard College, Columbia University); Prof. MARKA, Szabolcs (Columbia University); Prof. CONNAUGHTON, Valerie (University of Alabama in Huntsville)

Presenter: Dr NIETO CASTANO, Daniel (Columbia University)

Session Classification: Poster Session

Contribution ID: 116

Type: **oral**

ANAIS: Status and prospects

Tuesday, 30 September 2014 14:40 (20 minutes)

ANAIS (Annual modulation with NAI Scintillators) experiment will look for dark matter annual modulation with 250 kg of ultra-pure NaI(Tl) scintillators at the Canfranc Underground Laboratory (LSC), aiming to confirm the DAMA/LIBRA positive signal in a model-independent way. The detector will consist of 20 modules, each of them coupled to two photomultiplier tubes (PMTs). Two 12.5 kg each NaI(Tl) crystals provided by Alfa Spectra are currently taking data at the LSC. ANAIS crystal radiopurity goals are fulfilled for ^{40}K and ^{232}Th and ^{236}U chains, but a ^{210}Pb contamination out-of-equilibrium has been identified, whose origin has been determined and is being solved. The high light collection efficiency obtained with these prototypes allows us to anticipate an energy threshold of the order of 1 keVee. Finally, high quantum efficiency Hamamatsu PMT test and muon veto characterization are presented.

Primary authors: Mr ORTIZ DE SOLÓRZANO, Alfonso (Universidad de Zaragoza); Dr GINESTRA, Carlos (Universidad de Zaragoza); Dr POBES, Carlos (Universidad de Zaragoza); Dr CUESTA, Clara (University of Washington); Prof. GARCÍA, Eduardo (Universidad de Zaragoza); Prof. PUIMEDÓN, Jorge (Universidad de Zaragoza); Prof. VILLAR, José Ángel (Universidad de Zaragoza); Prof. AMARÉ, Julio (Universidad de Zaragoza); Prof. SARSA, María Luisa (Universidad de Zaragoza); Dr MARTÍNEZ, María (Universidad de Zaragoza); Mr OLIVÁN, Miguel Ángel (Universidad de Zaragoza); VILLAR, Patricia (Universidad de Zaragoza); Prof. CEBRIÁN, Susana (Universidad de Zaragoza); Dr ORTIGOZA, Ysrael (Universidad de Zaragoza)

Presenter: Mr OLIVÁN, Miguel Ángel (Universidad de Zaragoza)

Session Classification: Parallel Session B

Contribution ID: 117

Type: **not specified**

Cascade sensitivity studies for KM3NeT

Wednesday, 1 October 2014 15:20 (20 minutes)

KM3NeT is a future research infrastructure in the deep sea of the Mediterranean, hosting the next generation neutrino telescope. The instrumented volume of the telescope, of several cubic kilometers, will be split up in six smaller building block. The construction of the first phase of the telescope is in progress. The next step, internally named KM3NeT Phase 1.5, is to realize the first two building blocks in response to the observation of high energy neutrino events coming from outside the Earth atmosphere recently reported by the IceCube Collaboration; these signal events are expected to be originated by an all flavor isotropic cosmic neutrino flux with an energy cutoff at few PeVs. In the context of KM3NeT Phase 1.5, several efforts have been made to understand the sensitivity of a cubic kilometer neutrino telescope in the Mediterranean Sea to these events. In this contribution, I present some preliminary results on sensitivity studies directed to the observation of such a signal in the neutrino cascade channel, originating from all neutrino interactions but ν_{μ} CC. A 50% discovery at 5σ level of a signal flux analogous to the one reported by the IceCube Collaboration can be obtained with ~ 1.5 years operation of the KM3NeT Phase 1.5 detector with two building blocks in the Mediterranean Sea, with a total instrumented volume of about 1 km³.

Primary author: FUSCO, Luigi Antonio (BO)

Presenter: FUSCO, Luigi Antonio (BO)

Session Classification: Parallel Session E

Contribution ID: **118**Type: **not specified**

The AMY experiment:microwave emission from air shower plasmas.

Thursday, 2 October 2014 15:40 (20 minutes)

The Air Microwave Yield (AMY) experiment investigate the molecular bremsstrahlung radiation emitted in the GHz frequency range from an electron beam induced air-shower .

The measurements have been performed at the Beam Test Facility (BTF) of Frascati INFN National Laboratories with a 510 MeV electron beam in a wide frequency range between 1 and 20 GHz. We present the apparatus and the results of the tests performed.

Primary author: DI GIULIO, Claudio (ROMA2)

Presenter: DI GIULIO, Claudio (ROMA2)

Session Classification: Parallel Session I

Contribution ID: 119

Type: **not specified**

High Energy Astrophysics with the HAWC Gamma Ray Observatory

Wednesday, 1 October 2014 14:30 (20 minutes)

The High Altitude Water Cherenkov (HAWC) Observatory is being constructed at the Volcan Sierra Negra in Mexico (latitude 19° N) at 4,100m altitude. Having a modular design of 300 water Cherenkov detectors over an area of 22,000 m² it is designed to survey continuously the sky overhead with an instantaneous field of view of 2sr detecting air-showers from cosmic and gamma-rays at energies from 100 GeV to hundreds of TeV. A partial array of 100 detectors has been in operation for one year. Results from these observations that include a measurement of the small-scale anisotropies in the arrival direction of cosmic rays, the observation of several Forbush decreases and the detection of galactic and extra-galactic gamma ray sources will be presented. The final array is scheduled to be in operation by the end of this year. The sensitivity of HAWC to different type of sources and the operation and alert capabilities will be discussed.

Primary author: Dr SANDOVAL, Andres (Instituto de Fisica, UNAM, Mexico)

Presenter: Dr SANDOVAL, Andres (Instituto de Fisica, UNAM, Mexico)

Session Classification: Parallel Session F

Contribution ID: 120

Type: **oral**

Search for Ultra High Energy Primary Photons at the Pierre Auger Observatory

Wednesday, 1 October 2014 14:50 (20 minutes)

The Pierre Auger Observatory, located in Argentina, provides an unprecedented integrated aperture for the search of photons with energy above 10^{17} eV in a large portion of the southern sky. We will discuss the results obtained with fluorescence and surface detectors in diffuse and directional searches for primary photons in the EeV energy range.

Primary author: Mrs COLALILLO, Roberta for The Pierre Auger Collaboration (NA)

Presenter: Mrs COLALILLO, Roberta for The Pierre Auger Collaboration (NA)

Session Classification: Parallel Session F

Contribution ID: 121

Type: **oral**

TeV gamma ray astronomy with ground-based shower array detectors

Thursday, 2 October 2014 09:35 (35 minutes)

The TeV energy band is a very exciting window into the origin of high energy cosmic radiation, particle acceleration, and the annihilation of dark matter particles. Above a few hundred GeV, ground-based experiments of very large effective areas open a new domain to study extragalactic sources at intermediate redshifts, galaxy clusters, gamma ray bursts, AGN and their flaring states, extended sources and galactic diffuse emission, and to indirect searches for dark matter. In particular, ground arrays of particle detectors –that operate with high duty cycles and large fields of view–can extend to multi-TeV energies the measurements made with experiments on satellites, and complement the observations done with air Cherenkov telescopes on the ground. Key science goals of ground arrays include performing unbiased all-sky surveys, monitoring of transient events from known (and unknown!) sources, and detecting extended regions of diffuse emission. In this talk, I will describe the capabilities and limitations of ground arrays for TeV γ ray astronomy, and present the status and latest results from the leading experiments, including Tibet AS γ , ARGO-YBJ, HAWC, and LHAASO.

Primary author: Prof. MOSTAFA, Miguel (Penn State Univ.)

Presenter: Prof. MOSTAFA, Miguel (Penn State Univ.)

Session Classification: V Plenary Session

Contribution ID: 122

Type: **oral**

An example of a search for quark nuggets: nuclearites

Tuesday, 30 September 2014 16:55 (20 minutes)

The possibility to have super-heavy ultradense quark nuggets as dark matter candidates has been stressed again in recent times. This is due probably to the negative dark matter searches in LHC and in the direct and indirect experiments.

Nuclearites are an example of compact objects that could be constituents of the dark matter. Nuclearites of high mass could be confused with meteors.

I will discuss briefly the status of this search and the detection of meteors and nuclearites in the JEM-EUSO cosmic ray mission. Then I will present the results obtained using the cryogenic bar detectors of gravitational waves, used as particle detectors.

Primary author: Dr RONGA, Francesco (INFN)

Presenter: Dr RONGA, Francesco (INFN)

Session Classification: Parallel Session D

Contribution ID: 123

Type: **oral**

Tunka-133: Results of 5 Years Observation and Future Experiments

Wednesday, 1 October 2014 17:20 (30 minutes)

EAS Cherenkov light array Tunka-133 with ~ 3 km² geometric area operated since 2009. Five winter seasons of data acquisition (~ 107 triggers) and high quality of information permitted us to reconstruct primary energy spectrum and mass composition in the energy range $6 \cdot 10^{15}$ to 10^{18} eV. This energy range is the most important for understanding of transition from Galactic to extragalactic CR. The further experiments in Tunka Valley are briefly described –scintillation stations, Tunka radio extension, Tunka-HiSCORE, Tunka-IACT. The preliminary primary energy spectrum in the range 200 TeV - 20 PeV by the data of the first season of 9 HiSCORE stations operation will be presented. To start gamma-astronomy experiments in Tunka Valley researchers from a number of Russian and European Institutes arranged a Collaboration TAIGA (Tunka Advanced Instrument for cosmic ray and Gamma-Astronomy). The complex installation will consists of the net of wide-angle (1 sr field of view) Cherenkov light optical stations (Tunka-HiSCORE), several (~ 10) IACT telescopes based on hemispherical mirrors of 10 m² area (Tunka-IACT) and muon scintillation detectors of the total area ~ 2000 m².

Primary author: Prof. PROSIN, Vasily (Skobeltsyn Institute of Nuclear Physics of Lomonosov Moscow State University)

Presenter: Prof. PROSIN, Vasily (Skobeltsyn Institute of Nuclear Physics of Lomonosov Moscow State University)

Session Classification: Parallel Session H

Contribution ID: 124

Type: **not specified**

Status and perspectives of the Baikal-GVD project

Wednesday, 1 October 2014 16:30 (30 minutes)

The second-stage neutrino telescope Baikal-GVD in Lake Baikal will be a research infrastructure aimed mainly at studying astrophysical neutrino fluxes by recording the Cherenkov radiation of the secondary muons and showers generated in neutrino interactions. The design for the Baikal-GVD neutrino telescope is an array of photomultiplier tubes each enclosed in a transparent pressure sphere to comprise an optical module (OM). The OMs are arranged on vertical load-carrying cables to form strings. The final configuration of telescope will consist of 27 clusters of strings –functionally independent subarrays, which are connected to shore by individual electro-optical cables. The prototyping/early construction phase of the Baikal-GVD project which aims at deployment and operation of the first Demonstration Cluster has been started in 2011. Demonstration Cluster will comprise eight 345 m long strings of optical modules –seven peripheral strings are uniformly arranged at a 60 m distance around a central one. Each string comprises 24 OMs spaced by 15 m at depths of 950–1300 m below the surface. Also the Demonstration Cluster will comprise an acoustic positioning system and an instrumentation string with equipment for array calibration and monitoring of environment parameters. An important step on realization of the GVD project was made in 2013 by the deployment of the first stage of Demonstration Cluster which contains 72 OMs arranged on three 345 m long full-scale strings, as well as equipment of an acoustic positioning system and instrumentation string with an array calibration and environment monitoring equipment. This configuration has been upgraded to 5 string array with total of 112 OMs in 2014. Deployment of the Demonstration Cluster will be completed in 2015. The review of the design and status of the Demonstration Cluster construction will be presented.

Primary author: Prof. DZHILKIBAEV, Zhan-Arys (Institute for nuclear research, Moscow)

Presenter: Prof. DZHILKIBAEV, Zhan-Arys (Institute for nuclear research, Moscow)

Session Classification: Parallel Session G

Contribution ID: 125

Type: **poster**

Data acquisition system for the Baikal-GVD neutrino telescope

Tuesday, 30 September 2014 14:00 (20 minutes)

The first stage of the GVD-cluster which consists of a five strings is deployed in April 2014 in Lake Baikal. We review the architecture of the GVD data acquisition system and describe the configuration and design of the 2014 engineering array.

Primary author: Dr AYNUTDINOV, Vladimir (INR RAS)

Presenter: Dr AYNUTDINOV, Vladimir (INR RAS)

Session Classification: Parallel Session A

Contribution ID: 126

Type: **not specified**

Positron fraction, electron and positron spectra measured by AMS02

Thursday, 2 October 2014 14:00 (20 minutes)

A precise measurement by AMS02 of the electron spectrum up to 700 GeV and of the positron spectrum and positron fraction in primary cosmic rays up 500 GeV will be presented. In this contribution, we will review the analysis performed to determine the individual fluxes that for the first time have been extended to such high energies. The combined measurement of the cosmic-ray electron and positron energy spectra and fraction provide a unique tool to improve our understanding of the production, acceleration and propagation mechanism of cosmic rays.

Primary author: PIZZOLOTTO, Cecilia (INFN and ASDC)

Presenter: PIZZOLOTTO, Cecilia (INFN and ASDC)

Session Classification: Parallel Session J

Contribution ID: 127

Type: **not specified**

AMS-02: cosmic electron and positron ($e^+ + e^-$) spectrum up to 1 TeV

Thursday, 2 October 2014 14:20 (20 minutes)

The AMS-02 spectrometer, on the ISS since 2011, performs highly accurate measurements of cosmic rays up to the TeV region. We review the analysis of the cosmic ($e^+ + e^-$) flux in the energy range between 0.5 GeV and 1 TeV, based on 41 billion events. The high statistics and detector energy resolution allow for a study of the spectral shape of unprecedented quality, thus improving our understanding of the production, acceleration and propagation of cosmic rays. The resulting energy spectrum does not show prominent features.

Primary author: Dr BAZO ALBA, Jose Luis (ASDC & INFN)

Presenter: Dr BAZO ALBA, Jose Luis (ASDC & INFN)

Session Classification: Parallel Session J

Contribution ID: 128

Type: **oral**

Direct Dark Matter Search with XENON100

Tuesday, 30 September 2014 14:20 (20 minutes)

The XENON program aims at the direct detection of dark matter in the form of Weakly Interacting Massive Particles (WIMPs). A two-phase Time Projection Chamber (TPC) filled with ultra pure liquid xenon (LXe) is used for detecting nuclear recoils from WIMPs scattering off the Xe nuclei.

The XENON100 experiment is the second phase of the XENON program. It has a total mass of 161 kg of LXe, with a sensitive volume of 62 kg and 99 kg active veto. The results of the direct dark matter search with XENON100 will be presented. In particular, no evidence for dark matter is found in 224.6 live days of XENON100 data, excluding spin-independent WIMP-nucleon scattering cross sections above $2 \times 10^{-45} \text{ cm}^2$ for a 55 GeV/c² WIMP. The most stringent limit is established on the spin-dependent WIMP-neutron interaction for WIMP masses above 6 GeV, with a minimum cross section of $3.5 \times 10^{-40} \text{ cm}^2$ for a 45 GeV/c² WIMP.

Primary author: Dr ORRIGO, Sonja (IFIC-CSIC Valencia, Spain)

Presenter: Dr ORRIGO, Sonja (IFIC-CSIC Valencia, Spain)

Session Classification: Parallel Session B

Contribution ID: 129

Type: **poster**

Study on 3-inch Photomultipliers

Thursday, 2 October 2014 14:20 (20 minutes)

Several kinds of photomultipliers are widely used in astroparticle physics detectors to measure Cherenkov light in media like water or ice. In neutrino telescopes the key element of the detector is the optical module, which consists of one or more photodetectors inside a transparent pressure-resistant glass sphere. The glass sphere serves as mechanical protection while ensuring good light transmission. The KM3NeT collaboration has developed a new innovative prototype of a digital optical module composed by 31 photomultipliers of 3-inch diameter housed in a 17-inch glass sphere looking downwards and upwards. The performance of the telescope is largely dependent on the presence of noise pulses due to several causes.

A study of noise pulses was conducted on Hamamatsu 3-inch diameter photomultipliers measuring time and charge distributions of dark pulses, pre-pulses, delayed pulses, and after-pulses, focusing in particular on analysis on multiple after-pulses. Effects of Earth's magnetic field on 3-inch PMTs were also studied. We confront measurements of typical parameters with and without a magnetic shielding.

Primary authors: LEONORA, Emanuele (CT); AIELLO, Sebastiano (CT); Dr GIORDANO, Valentina (CT)

Presenter: Dr GIORDANO, Valentina (CT)

Session Classification: Parallel Session I

Contribution ID: 130

Type: **oral**

Dark Matter Studies and Results with ANTARES Neutrino Telescope

Tuesday, 30 September 2014 19:30 (20 minutes)

The ANTARES neutrino telescope is the largest water Cherenkov neutrino telescope in operation in the Northern hemisphere, installed in the Mediterranean Sea. One of the main objectives of ANTARES is the searches for neutrinos produced in self-annihilation of Dark Matter particles. Results on the search for Dark Matter annihilations in the Sun will be presented. The obtained competitive limits on the WIMP-proton cross-section are compared to the ones of other indirect and direct detection searches. Results of ANTARES on Dark Matter searches towards the Galactic Centre will also be shown. Competitive limits on the annihilation cross-sections for high mass WIMPs have been obtained. Finally, the work on indirect searches towards dwarf galaxies and the centre of the Earth will also be addressed.

Primary author: Dr ARDID, Miguel (IGIC- Universitat Politècnica de València)

Presenter: Dr BOU-CABO, Manuel (UPV)

Session Classification: Poster Session

Contribution ID: 131

Type: **oral**

The Multi-Messenger Search Programme and Results of the ANTARES Neutrino Telescope

Wednesday, 1 October 2014 17:20 (20 minutes)

The key-word of modern astronomy and astrophysics is multi-messenger: not only photons used as probes for the investigation of the Universe, but also cosmic-rays, neutrinos and gravitational waves. Joining the efforts and skills of different experiments and collaborations, additional tools for data analysis can be enabled. The multi-messenger approach is important in particular for neutrino detectors: potential astrophysical sources are predicted to emit a very faint neutrino signal and the presence of an isotropic flux of atmospheric background requires the development of effective search strategies. The multi-messenger approach is a valid procedure, since it can increase the discovery potential by observing the same source with different probes. Moreover, the statistical significance of the observations can be improved by coincident detection (sustained by the development of alert systems between the experiments) and the efficiency of the detection can be refined profiting of relaxed cuts. The advantages of the multi-messenger approach are evident, in particular, when looking at transient or flaring sources.

In ANTARES (Astronomy with a Neutrino Telescope and Abyss environmental RESearch), a wide programme of multi-messenger searches is active. The strongest connection is with Gamma Astronomy, since both gamma-rays and neutrinos are expected from cosmic emitters if hadronic processes take place. Several studies have been carried on, looking for neutrino signals from gamma-flaring sources (as blazars and microquasars) and from Gamma-Ray Bursts. Public data of Fermi-LAT, SWIFT, RXTE and of observatories in the GCN (Gamma-ray Coordination Network) have been used for the search. Public data of the Pierre Auger Observatory have been used for another study, aiming at the search for a correlation between ANTARES neutrinos and ultra-high-energy cosmic rays. In addition, ANTARES has promoted the TAToO project (Telescopes/ANTARES Target of Opportunity), for the optical follow-up of neutrino alerts for the study of transient sources (GRBs, SNe), and the GWHEN working group (Gravitational Waves and High Energy Neutrino), for which a set of selected ANTARES candidate neutrino events have been used to “trigger” the data analysis of gravitational wave observatories VIRGO/LIGO. The above mentioned activities and results of the ANTARES Multi-Messenger Programme will be presented and discussed in this contribution.

Primary author: DE BONIS, Giulia (ROMA1)

Co-author: THE ANTARES COLLABORATION, ANTARES (ANTARES)

Presenter: DE BONIS, Giulia (ROMA1)

Session Classification: Parallel Session G

Contribution ID: 132

Type: **poster**

Dark matter searches using superheated liquid detectors

Thursday, 2 October 2014 14:00 (20 minutes)

In this talk, the technique of using bubble nucleation in superheated liquid detectors for dark matter searches is addressed. This technique can be very competitive, especially for the case of spin dependent interaction. Different detectors, such as bubble chambers, liquid droplets and geyser chambers will be presented. Finally, the activities and results of PICO bubble chambers will be shown. A new world-best spin dependent WIMPproton cross-section limit has been obtained with the first physics run of PICO 2L-detector.

Primary author: Dr ARDID, Miguel (IGIC- Universitat Politècnica de València)

Presenter: Dr BOU-CABO, Manuel (UPV)

Session Classification: Parallel Session I

Contribution ID: 133

Type: **not specified**

Secluded Dark Matter search in the Sun with the ANTARES neutrino telescope

Tuesday, 30 September 2014 18:50 (20 minutes)

Models where Dark Matter (DM) is secluded from the Standard Model via a mediator have increased their presence during the last decade to explain some experimental observations. This is a special scenario where DM, which would gravitationally accumulate in sources like the Sun, the Earth or the Galactic Centre, is annihilated into a non-standard Model mediator which subsequently decays into Standard Model particles, two co-linear muons for example. As the lifetime of the mediator could be large enough, its decay may occur in the vicinity of the Earth and the resulting SM particles could be detected. In this work we will describe the analysis for secluded dark matter coming from the Sun with ANTARES in three different cases: a) detection of di-muons that result of the mediator decay, or neutrino detection from: b) mediator that decays into di-muon and, in turn, into neutrinos, and c) mediator that directly decays into neutrinos. Sensitivities and results of the analysis for each case will be presented.

Primary author: Ms ADRIÁN MARTÍNEZ, Silvia (Universidad Politécnica de Valencia)

Presenter: Ms ADRIÁN MARTÍNEZ, Silvia (Universidad Politécnica de Valencia)

Session Classification: Poster Session

Contribution ID: 134

Type: **poster**

The optical modules for the 8 towers of the KM3NeT-Italia project

Tuesday, 30 September 2014 19:50 (20 minutes)

The KM3NeT European experiment aims to construct a large volume underwater neutrino telescope, to be installed in the depths of the Mediterranean Sea. Thanks to a dedicated funding provided by the Italian Ministry of Education, University and Research (MIUR) with PON 2007-2013 resources, in a first phase, commonly referred as KM3NeT-Italia, an 8-towers detector will be constructed, that shares the same technology of the previously NEMO Phase-2 towers, but with some important variations: the number of optical modules per floor will be 6, the number of floors per tower will be 14, interleaved by 20 m and the towers will be spaced by a mean distance of 120 m. The detection element of the telescope, the optical module, will be composed by a 13-inch high-pressure glass-vessel that contains a single 10-inch photomultiplier (PMT), optically and mechanically coupled by means of a transparent silicon gel. A mu-metal cage surrounds the PMT to shield it against the Earth's magnetic field. The power supply system, the front-end electronic module and a LED-system designed for underwater calibrations are also hosted into the glass sphere.

The optical modules mass production phase started some months ago and will be entirely performed in the INFN-LNS site in the harbour of Catania. Over 700 photomultipliers have been tested by means of a dedicated test bench, and over 100 optical modules have been fully assembled and tested, ready for the next deployment phases.

In the proposed talk, the optical module layout and its components will be described in details, and the main results from the massive photomultipliers measurements will be also presented. In order to share information for next mass productions, the main assembly procedure phases will be also highlighted.

Primary author: Dr LEONORA, Emanuele (INFN-sezione di Catania)

Co-authors: Dr VENTURA, Carlo (INFN - sezione di Catania); Dr AIELLO, Sebastiano (INFN-sezione di Catania); Dr GIORDANO, Valentina (INFN-sezione di Catania)

Presenter: Dr LEONORA, Emanuele (INFN-sezione di Catania)

Session Classification: Poster Session

Contribution ID: 135

Type: **oral**

Measurement of the all-particle and light-component cosmic ray energy spectra with ARGO-YBJ

Wednesday, 1 October 2014 16:30 (30 minutes)

Cosmic ray physics in the 1TeV-10PeV primary energy range is among the main scientific goals of the ARGO-YBJ experiment. The detector, located in the Cosmic Ray Observatory of Yangbajing (Tibet, China) at 4300m a.s.l., is a full coverage Extensive Air Shower array, consisting of a carpet of Resistive Plate Chambers (RPC) of about 7000m². The apparatus layout, performance and location offer a unique opportunity for a detailed study of several characteristics of the cosmic ray flux. Moreover the analog readout of the RPC signals indeed provides a powerful tool to study, with unprecedented resolution and without saturation, the extensive air shower space-time structure down to few meters from its axis.

New results concerning the measurement of the all-particle and of the light-component (i.e. protons and helium) cosmic ray energy spectra, between approximately 5 TeV and 5 PeV, will be reported.

The study of this energy region is particularly important not only for a better understanding of the so called knee of the energy spectrum and of its physical origin, but also as a powerful cross check among very different experimental methods (e.g. direct vs indirect measurements).

A precise knowledge of CR spectra in this energy region is also a fundamental input for any reliable calculation of atmospheric neutrino and muon fluxes.

Primary author: DE MITRI, Ivan (LE)

Presenter: DE MITRI, Ivan (LE)

Session Classification: Parallel Session H

Contribution ID: 136

Type: **oral**

Searches for diffuse fluxes of cosmic neutrinos with the ANTARES telescope

Wednesday, 1 October 2014 17:00 (20 minutes)

The ANTARES neutrino telescope, located at a depth of 2475 m under the Mediterranean Sea, 42 km from Toulon, France, consists of a three dimensional array of 885 10-inch photomultiplier tubes, distributed along twelve vertical lines. It is currently the largest operating underwater neutrino telescope and its main goal is to search for high energy neutrinos of cosmic origin.

The search for a cosmic neutrino signal can be addressed to all the different neutrino flavors and interaction channels, as neutrino oscillations are expected to give at Earth equal fluxes for the three neutrino species and the telescope can be used to detect neutrinos undergoing all the weak interaction processes. A cosmic neutrino signal can also either show up in point-like sources or in a diffuse flux coming from unresolved individual objects. The observation of neutrinos from astrophysical sources is a fundamental proof of hadronic acceleration processes of cosmic rays and can give strong informations on the mechanisms working at their production sites.

In this contribution the current status of diffuse fluxes searches using data collected by the ANTARES telescope will be given. In the charged current (CC) ν_μ channel, data collected from 2008 to 2011 have been used and an upper limit on the flux has been set as the observations are compatible with background expectations. A search for neutrinos from all other interaction channels and flavors, using data from 2007 to 2012 and shower-like events, has also produced an upper limit on cosmic neutrino fluxes.

Large areas of the sky such as the Galactic Centre region or the Fermi Bubbles structure are also predicted to produce a diffuse flux of cosmic neutrinos and the analysis of ANTARES data in the CC ν_μ channel does not report any significant excess on the expected background, resulting in upper limits on the possible neutrino fluxes from these locations.

In addition a measurement of the atmospheric neutrino energy spectrum from 100 GeV to 200 TeV, irreducible background for cosmic neutrino searches, will be presented.

Primary author: FUSCO, Luigi Antonio (BO)

Presenter: FUSCO, Luigi Antonio (BO)

Session Classification: Parallel Session G

Contribution ID: 137

Type: **not specified**

The ARCADE project

Thursday, 2 October 2014 15:20 (20 minutes)

In cosmic rays experiments based on the measurement of UV light, the knowledge and constant monitoring of the atmospheric transmission through aerosols is fundamental, due to the large time variation. The corresponding correction to EAS energy can range from a few percent to more than 40%, depending on aerosol attenuation conditions, distance of the shower and energy. The Atmospheric Research for Climate and Astroparticle DEtection (ARCADE) project is a 3 years project funded by MIUR that is presently in its final year. The target of the project is the study the aerosol attenuation of UV light in atmosphere using multiple instruments and techniques, as those commonly used in the cosmic rays community : elastic Lidar, Raman Lidar, side-scattering measurements using a distant UV laser source. Measurements campaigns are presently performed on the same air mass at the same time, in Southeastern Colorado (Lamar), a semi-desertic site as those typically hosting cosmic rays experiments. For each instrument, multiple analysis techniques will be tested: the aim is a better comprehension of the systematics and limits of applicability of each method. The system is composed by a Lidar (elastic+Raman), fully designed and built within this project, and by the Atmospheric Monitoring Telescope (AMT), a telescope for the detection of UV light owned by the Colorado School of Mines. A full simulation of the reponse of the AMT to laser signals have been developed. The setup of the two instruments is described in detail here. Both systems have been installed in June-July 2014 on site in Colorado and are presently taking the first data.

Primary authors: Dr TONACHINI, Aurelio Siro (University of Torino); Dr VALORE, Laura (University of Napoli and INFN Napoli); Prof. WIENCKE, Lawrence (Colorado School of Mines); Dr CILMO, Marco (University of Napoli); Dr BUSCEMI, Mario (University of Napoli and INFN Napoli); Dr COCO, Michael (University of Torino)

Presenter: Dr TONACHINI, Aurelio Siro (University of Torino)

Session Classification: Parallel Session I

Contribution ID: 138

Type: **not specified**

Operation and results of the prototype KM3NeT detection unit

Tuesday, 30 September 2014 14:40 (20 minutes)

KM3NeT will be a km³-scale neutrino telescope in the Mediterranean Sea. The detector will consist of several blocks of about one hundred detection units. Each detection unit will host 18 Digital Optical Modules (DOMs), connected along a 700 m-long vertical structure. Electro-optical cables allow for data transmission and power supply to the DOMs. The optical module comprises 31 photomultipliers of 3", as well as various instruments to monitor environmental variables. A prototype detection unit has been deployed in May 2014 at the KM3NeT-It installation site 100 km SE of shore of Capo Passero, Sicily. This prototype allowed to test the deployment procedures, the mechanics and the electronic of the apparatus, the data taking and analysis procedures. A general description of the detector and the preliminary results of the prototype are presented. It is expected that the first detection units of the KM3NeT neutrino telescope are deployed and become operative early 2015.

Primary author: BIAGI, Simone (LNS)

Presenter: BIAGI, Simone (LNS)

Session Classification: Parallel Session A

Contribution ID: 139

Type: **oral**

The next generation dark matter hunter: XENON1T status and perspective

Tuesday, 30 September 2014 16:15 (20 minutes)

The XENON Dark Matter Experiment has been ongoing at LNGS since 2005 with the goal of searching for dark matter WIMPs with liquid xenon as target and detector material. With detectors of increasing target mass and decreasing background, the XENON program has achieved competitive limits on WIMP-nucleon interaction couplings, but also on axions and axion like particles.

With the start of the next generation experiment, XENON1T expected in 2015, XENON Dark Matter Experiment will continue to lead field of dark matter direct detection. XENON1T will be the first experiment to use multi-tons of liquid xenon in a time projection chamber and is designed to achieve two orders of magnitude higher sensitivity than the current best limits. I will review the status of construction and the scientific goals of XENON1T.

Primary author: Dr RIZZO, Alfio (Columbia University)

Presenter: Dr RIZZO, Alfio (Columbia University)

Session Classification: Parallel Session D

Contribution ID: 140

Type: **oral**

DAMA/LIBRA-phase1 results and perspectives of the phase2

Tuesday, 30 September 2014 14:00 (20 minutes)

The DAMA/LIBRA set-up (about 250 kg highly radiopure NaI(Tl)) is running at the Gran Sasso National Laboratory of INFN. The cumulative DAMA/LIBRA-phase1 data (1.04 ton x year) have been released; the data of the former DAMA/NaI and of the DAMA/LIBRA-phase1 (cumulative exposure 1.33 ton x yr) satisfy all the many requirements of the Dark Matter annual modulation signature at 9.3 sigma confidence level.

DAMA/LIBRA is now in data taking in the new configuration DAMA/LIBRA-phase2, using new higher quantum efficiency PMTs. Results, implications and experimental perspectives of the experiment will be addressed.

Primary author: Dr CERULLI, Riccardo (INFN)

Presenter: Dr CERULLI, Riccardo (INFN)

Session Classification: Parallel Session B

Contribution ID: **141**

Type: **not specified**

Some open questions in particle astrophysics

Tuesday, 30 September 2014 10:00 (40 minutes)

Presenter: GAISSER, thomas (University of Delaware)

Session Classification: I Plenary Session

Contribution ID: 142

Type: **not specified**

Cosmic rays measurements around the knee

Presenter: CHIAVASSA, Andrea (t.b.c.)

Contribution ID: 143

Type: **oral**

Galactic gamma-ray astronomy and cosmic ray origin

Thursday, 2 October 2014 09:00 (35 minutes)

I will review some of the recent results of galactic gamma ray astronomy, both in the GeV and TeV domain. I will focus on those results which shed new light on some aspects of the process of acceleration of cosmic rays in the Galaxy.

Presenter: GABICI, Stefano (APC)

Session Classification: V Plenary Session

Contribution ID: 144

Type: **not specified**

Walking the Milky Way: Background systematics for Dark Matter Searches

Friday, 3 October 2014 11:45 (35 minutes)

Presenter: WENIGER, Christoph

Session Classification: VIII Plenary session

Contribution ID: 146

Type: **not specified**

Theory status for neutrino fluxes

Contribution ID: **147**

Type: **not specified**

IceCube recent results

Contribution ID: **148**

Type: **not specified**

Status on gravitational waves search

Friday, 3 October 2014 10:00 (35 minutes)

Presenter: RICCI, Fulvio (ROMA1)

Session Classification: Plenary Session 7th

Contribution ID: **149**

Type: **not specified**

Status on H.E. C.R. radio detection experiments

Contribution ID: **150**

Type: **not specified**

Hadronic Physics and Astroparticle Physics

Friday, 3 October 2014 10:35 (35 minutes)

Presenter: LIPARI, Paolo

Session Classification: Plenary Session 7th

Contribution ID: **151**

Type: **not specified**

Theory status on direct/indirect D.M. search

Contribution ID: 152

Type: **not specified**

Status on direct D.M. search

Contribution ID: 153

Type: **not specified**

Dark Matter indirect detection: some anomalies and many constraints.

Presenter: CIRELLI, Marco (t.b.c.)

Contribution ID: 154

Type: **not specified**

Theory talk on H.E. astrophysical neutrino fluxes

Contribution ID: 155

Type: **not specified**

Recent results from IceCube experiment

Contribution ID: 156

Type: **oral**

The New Gamma-Ray Observatory: CTA

Thursday, 2 October 2014 11:15 (35 minutes)

The Cherenkov Telescope Array (CTA) will provide a new ground based gamma-ray observatory with sensitivity ten-times better than existing gamma-ray experiments. CTA will also have a much wider energy range and improved angular resolution.

The presentation will describe the telescope array which is reaching the final stages of design and prototyping. A vital first decision for CTA will be the choice of the sites and the status of this will be given, together with the general schedule expected. The science program will be presented with some focus on the plans for indirect searches for dark matter.

Primary author: CARR, John (CPPM/IN2P3/CNRS)

Co-author: ON BEHALF OF THE CTA COLLABORATION

Presenter: CARR, John (CPPM/IN2P3/CNRS)

Session Classification: VI Plenary Session

Contribution ID: **157**

Type: **not specified**

KM3NeT status

Presenter: RICCOBENE, Giorgio (t.b.c.)

Contribution ID: **158**

Type: **not specified**

Future of H.E. C.R. ground based experiment

Thursday, 2 October 2014 11:50 (35 minutes)

Presenter: DI SCIASCIO, Giuseppe (ROMA2)

Session Classification: VI Plenary Session

Contribution ID: **159**

Type: **not specified**

Conference Summary on H.E. cosmic rays

Contribution ID: **160**

Type: **not specified**

Conference Summary on H.E. gamma

Contribution ID: **161**

Type: **not specified**

Conference Summary on H.E. neutrino

Contribution ID: **162**

Type: **not specified**

Concluding remarks

Friday, 3 October 2014 16:15 (15 minutes)

Presenter: PIATTELLI, Paolo (LNS)

Session Classification: Plenary Session: Conference Summary Talks and concluding remarks

Contribution ID: **163**

Type: **oral**

Dark Matter indirect detection: some anomalies and many constraints

Friday, 3 October 2014 12:55 (35 minutes)

I will give a status assessment of DM indirect searches. I will discuss 4 recent claims of detection, the constraints to which they are subject and the theory directions that they have spurred.

Primary author: Mr CIRELLI, Marco (CERN & IPHT CEA/Saclay)

Presenter: Mr CIRELLI, Marco (CERN & IPHT CEA/Saclay)

Session Classification: VIII Plenary session

Contribution ID: 164

Type: **not specified**

Correlating the Hot Spot in UHECR rays with its possible source

Wednesday, 1 October 2014 17:50 (20 minutes)

UHECR (Ultra High Energy Cosmic Rays) are reaching a large sample of events both in the South (by AUGER) and recently also in the North terrestrial emisphere (by TA, Terrestrial Array Telescope). The latter events are showing an apparent wide Hot Spot clustering toward an unexpected area of the sky. Some tentative correlation with Ursa Major Cluster has been offered: however the remarkable absence of the much larger nearby Virgo cluster call for a deeper and more convincing explanation. We will show that our proposal based on lightest nuclei model may solve the present Hot Spot presence and Virgo absence. A similar successful model has been considered since 2008 to explain the mysterious Cen A spread clustering in AUGER data.

Primary author: Prof. FARGION, Daniele (INFN and Dipt Fisica Sapienza)

Presenter: Prof. FARGION, Daniele (INFN and Dipt Fisica Sapienza)

Session Classification: Parallel Session H

Contribution ID: 165

Type: **poster**

New Eyes for Tau Airshowers

Tuesday, 30 September 2014 19:10 (20 minutes)

Highest energy neutrino (above atmospheric noise) has been disentangled recently by ICECUBE. The dominance of the Cascade Shower events over muon neutrino tracks has been well established; the absence of the Glashow anti neutrino - electron resonance has been also noted. Therefore the probable paucity of Tens PeV up to EeV neutrino flux makes still difficult the fluorescence detection of the expected Tau Airshowers (in AUGER,TA). Nevertheless the blazing Cherenkov shower are still well detectable. A new array telescopes and detectors, their peculiar geometry and optics tuned for tau airshowers, will be described.

Primary author: Prof. FARGION, Daniele (ROMA1)

Presenter: Prof. FARGION, Daniele (ROMA1)

Session Classification: Poster Session

Contribution ID: 166

Type: **oral**

Probing cosmic rays in nearby giant molecular clouds with the Fermi Large Area Telescope

Thursday, 2 October 2014 14:40 (20 minutes)

We report the results of our study of the energy spectra and absolute fluxes of cosmic rays (CRs) in the Local Galaxy based on a five-year γ -ray observation with the Fermi Large Area Telescope (LAT) of eight nearby giant molecular clouds (GMCs) belonging to the Gould Belt. The γ -ray signals obtained with high statistical significance allow the determination of γ -ray spectra above 300 MeV with adequate precision for extraction of the energy distributions of CRs in these clouds. Remarkably, both the derived spectral indices and the absolute fluxes of CR protons in the energy interval 10 – 100 GeV agree with the recent direct measurements of local CRs by the PAMELA experiment. This is strong evidence of a quite homogeneous distribution of CRs, at least within several hundred parsecs of the Local Galaxy. Combined with the well established energy-dependent time of escape of CRs from the Galaxy, $\tau(E) \propto E^{-\delta}$ with $\delta \approx 0.5 - 0.6$, the measured spectrum implies a CR spectral index of the (acceleration) source of $\approx E^{-2.3}$. At low energies, the spectra of γ rays appear to vary from one cloud to another. This implies spatial variations of the energy spectra of CRs below 10 GeV, which at such low energies could be explained naturally by both the impact of the propagation effects and the contribution of CR locally accelerated inside the clouds.

Primary author: Dr YANG, Ruizhi (Max-planck-institute for nuclear physics)

Co-authors: Prof. AHARONIAN, Felix (Dublin Institute for Advanced Studies); Dr DE ONA WILHELM, emma (ICE)

Presenter: Dr YANG, Ruizhi (Max-planck-institute for nuclear physics)

Session Classification: Parallel Session J

Contribution ID: 167

Type: **oral**

Experimental results on the atmospheric muon charge ratio

Tuesday, 30 September 2014 16:55 (20 minutes)

The atmospheric muon charge ratio, defined as the number of positive over negative charged muons, is a highly informative observable both for cosmic rays and particle physics. It allows studying the features of high-energy hadronic interactions in the forward region and the composition of primary cosmic rays.

We present a review of results from underground experiments measuring the charge ratio above 1 TeV.

The measurements in the TeV energy region constrain the associated kaon production, which is particularly important for the calculation of the atmospheric neutrino flux.

Primary author: Dr MAURI, Nicoletta (University of Bologna and INFN)

Presenter: Dr MAURI, Nicoletta (University of Bologna and INFN)

Session Classification: Parallel Session C

Contribution ID: **168**Type: **not specified**

Potential of KM3NeT to observe galactic neutrino point-like sources

Tuesday, 30 September 2014 15:20 (20 minutes)

KM3NeT (<http://www.km3net.org>) will be the next-generation cubic-kilometre-scale neutrino telescope to be installed in the depths of the Mediterranean Sea. This location will allow for surveying the Galactic Centre, most of the Galactic Plane as well as a large part of the sky.

The search for neutrinos from galactic sources is a relevant physics objective for KM3NeT. Among galactic point-like sources, SuperNova Remnants (SNR) and Pulsar Wind Nebulae (PWN) are among the most promising sources of high-energy cosmic rays as well as neutrinos. In the hypothesis of hadronic gamma emission, models for galactic neutrino sources are robustly constrained by TeV-gamma observations thus allowing to obtain realistic estimates of the neutrino fluxes.

We report KM3NeT discovery potential for the SNR RXJ1713.7-3946 and the PWN Vela X and its sensitivity to point-like sources with an E^{-2} spectrum. Other sources and possibility of a stacking analysis for several classes of source are under investigation. Further studies aiming at the improvements of detector capabilities are on-going.

Primary author: TROVATO, Agata (LNS)

Presenter: TROVATO, Agata (LNS)

Session Classification: Parallel Session A

Contribution ID: 169

Type: oral

Semi-relativistic hypernova as sources of PeV neutrinos

Wednesday, 1 October 2014 14:40 (20 minutes)

We argue that the excess of sub-PeV/PeV neutrinos recently reported by IceCube could plausibly originate through pion-production processes in the same sources responsible for cosmic rays (CRs) with energy above the second knee around 10^{18} eV. The pion production efficiency for escaping CRs that produce PeV neutrinos is required to be >0.1 in such sources. On the basis of current data, we identify semi-relativistic hypernova remnants as possible sources that satisfy the requirements. By virtue of their fast ejecta, such objects can accelerate protons to EeV energies, which in turn can interact with the dense surrounding medium during propagation in their host galaxies to produce sufficient high-energy neutrinos via proton-proton (pp) collisions. Their accompanying gamma ray flux can remain below the diffuse isotropic gamma ray background observed by the Fermi Large Area Telescope (LAT). In order to test this scenario and discriminate from alternatives, the density of target protons/nuclei and the residence time of CRs in the interacting region are crucial uncertainties that need to be clarified. As long as the neutrinos and EeV CRs originate from the same source class, detection of >10 PeV neutrinos may be expected within 5-10 years' operation of IceCube. Together with further observations in the PeV range, the neutrinos can help in revealing the currently unknown sources of EeV CRs.

Primary author: Mr LIU, Ruoyu (Max-Planck-Institute for Nuclear Physics (MPIK))

Co-authors: Prof. AHARONIAN, Felix (Dublin Institute for Advanced Studies); Dr CROCKER, Roland (Australian National University); Dr INOUE, Susumu (Max-Planck-Institute for Physics (MPP)); Prof. WANG, Xiangyu (Nanjing University)

Presenter: Mr LIU, Ruoyu (Max-Planck-Institute for Nuclear Physics (MPIK))

Session Classification: Parallel Session E

Contribution ID: 170

Type: **oral**

MAGIC Highlights

Thursday, 2 October 2014 10:10 (35 minutes)

MAGIC is one of the main detectors for performing ground-based observations of VHE gamma-ray sources. It consists of two 17m diameter Imaging Atmospheric Cherenkov telescopes. The telescopes are located at 2200 m a.s.l. at the Roque de los Muchachos, on the Canary island of la Palma, Spain. They are designed to observe gamma rays with energies above ~50 GeV. The system recently underwent a major upgrade and starting fall 2012 it is taking data with an unprecedented integral sensitivity of 0.66% C.U. above 220 GeV. In this presentation we will report about status of the telescopes and the most recent physics highlights, including the fast variability of the radio galaxy IC310, studies of the Crab Nebula, the VHE bridge emission of the Crab pulsar, dark matter studies, discoveries and observations of new sources.

Presenter: LÓPEZ-COTO, Rubén (Institut de Física d'Altes Energies - IFAE)

Session Classification: V Plenary Session

Contribution ID: **171**

Type: **not specified**

HESS

Presenter: GABICI, Stefano (t.b.c.)

Contribution ID: 172

Type: **oral**

Gamma-ray binaries observed with HESS

Wednesday, 1 October 2014 15:30 (20 minutes)

We report on the observations of gamma-ray emitting binaries obtained with the High Energy Stereoscopic System of Cherenkov telescopes. Recent results on PSR B1259-63, HESS J0632+057 and HESS J1018-589 will be reviewed. In the case of PSR B1259-63, a detailed multiwavelength campaign from radio to VHEs has been organized to follow its periastron passage in 2014, including also the occurrence of the expected GeV flaring episode. In HESS J0632+057, a long-term X-ray/TeV monitoring of the source reveals that, although faint, significant VHE fluxes are produced in a wide orbital phase range, whereas the source remains undetected at GeV energies. For HESS J1018-589, the analysis of new HESS data shows significant flux variability, well correlated with that observed at GeVs, which definitely classifies this source as a new VHE gamma-ray binary system. The high-quality HESS observations, combined with data obtained at lower energies, are providing accurate information on the physics of relativistic outflows powered by Galactic compact objects, rising at the same time new enigmas, which will also be discussed.

Primary author: Dr BORDAS, Pol (Max-Planck-Institut für Kernphysik)

Presenter: Dr BORDAS, Pol (Max-Planck-Institut für Kernphysik)

Session Classification: Parallel Session F

Contribution ID: 173

Type: **oral**

Measurement of the atmospheric muon flux at 3500 m depth with the NEMO Phase-2 detector

Wednesday, 1 October 2014 17:40 (20 minutes)

In March 2013, the Nemo Phase-2 tower was successfully deployed at 100 km off-shore Capo Passero (Italy) at 3500 m depth. The tower operated continuously until August 2014. We present the results of the muon analysis from the data collected in 411.1 days of live time.

The zenith angular distribution of atmospheric muons was measured and results compared with Monte Carlo simulations. The associated depth intensity relation was then measured and compared with previous measurements and theoretical predictions.

Primary author: DISTEFANO, Carla (LNS)

Presenter: DISTEFANO, Carla (LNS)

Session Classification: Parallel Session G

Contribution ID: 174

Type: **oral**

Cosmic rays measurements around the knee

Wednesday, 1 October 2014 11:15 (35 minutes)

I will present the latest results obtained by EAS experiments operating in the 10^{14} - 10^{18} eV energy range, highlighting the major achievements, relating them with higher and lower energies measurements.

The more relevant contributions to the systematic errors in the primary energy and mass determination by EAS experiments will be discussed.

In conclusion I will present and discuss a qualitative data interpretation in terms of elemental spectra with knees at constant rigidity.

Primary author: CHIAVASSA, Andrea (Universita' agli Studi di Torino)

Presenter: CHIAVASSA, Andrea (Universita' agli Studi di Torino)

Session Classification: Plenary Session 4th

Contribution ID: 175

Type: **poster**

Nemo Phase II optical background measurements and environmental observations

Tuesday, 30 September 2014 20:10 (20 minutes)

The Nemo Phase II tower has been successfully taking data over one year. It has been installed on march the 23rd 2013 at Capo Passero, Italy, at 3500 m depth. The 8-floor tower hosts 32 10-inch PMT's.

Results of background measurements as well as environmental parameters will be presented. During more than one year long measurements, the analyzed rates show stable and low baseline values, compatible with the contribution of 40K light emission, with a small percentage of light bursts due to bioluminescence.

Primary author: Dr PELLEGRITI, Maria Grazia (LNS-INFN)

Presenter: Dr PELLEGRITI, Maria Grazia (LNS-INFN)

Session Classification: Poster Session

Contribution ID: 176

Type: **oral**

Status of KM3NeT

Thursday, 2 October 2014 12:25 (35 minutes)

TBD

Primary author: RICCOBENE, Giorgio Maria (LNS)

Presenter: RICCOBENE, Giorgio Maria (LNS)

Session Classification: VI Plenary Session

Contribution ID: 178

Type: **not specified**

Results from Agile

Presenter: PIANO, Giovanni

Contribution ID: 179

Type: **oral**

IceCube neutrinos: The beginning of extra-Galactic neutrino astronomy

Wednesday, 1 October 2014 09:00 (35 minutes)

Presenter: Prof. WAXMAN, Eli (Weizmann Institute)

Session Classification: III Plenary Session

Contribution ID: **180**

Type: **not specified**

Gamma-ray and neutrino fluxes from Heavy Dark Matter in the Galactic Center

Presenter: GAMMALDI, Viviana

Contribution ID: **181**

Type: **not specified**

Multimessenger searches

Presenter: RAZZANO, Massimiliano

Contribution ID: **182**

Type: **not specified**

Theory UHECR

Presenter: T.B.C.

Contribution ID: **183**

Type: **not specified**

H.E. and U.H.E. neutrinos from astrophysical sources in the IceCube and ARA era (t.b.c.)

Presenter: Prof. GUETTA, Dafne (OAR INAF)

Contribution ID: **184**

Type: **oral**

High Energy Neutrinos and Ultra High Energy Neutrinos in the IceCube and ARA era

Wednesday, 1 October 2014 12:25 (35 minutes)

I will review several models for the flux of high and ultra high energy neutrinos from astrophysical sources.

I will discuss the constraints that can be imposed from the IceCube data and that will be imposed by the next generation ultra high energy neutrino telescope like ARA.

Primary author: Prof. GUETTA, Dafne (OAR INAF)

Presenter: Prof. GUETTA, Dafne (OAR INAF)

Session Classification: Plenary Session 4th

Contribution ID: **185**

Type: **oral**

Latest developmental status in Hamamatsu PMTs

Thursday, 2 October 2014 14:40 (20 minutes)

Hamamatsu are developing various types of PMTs for many applications. We will show the latest developmental status in our PMTs.

Primary author: Dr HOTTA, Yuji (Hamamatsu Photonics K.K.)

Presenter: Dr HOTTA, Yuji (Hamamatsu Photonics K.K.)

Session Classification: Parallel Session I

Contribution ID: **186**

Type: **oral**

Recent Results from the IceCube Neutrino Observatory

Wednesday, 1 October 2014 09:35 (35 minutes)

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Primary author: FINLEY, Chad (Stockholm University)

Presenter: FINLEY, Chad (Stockholm University)

Session Classification: III Plenary Session

Contribution ID: **187**Type: **oral**

AGILE highlights in gamma-ray astrophysics

Thursday, 2 October 2014 15:20 (20 minutes)

The AGILE space mission, currently in its eight year of operations in orbit, obtained a large number of crucial and unexpected findings. We review the main results for both Galactic and extragalactic sources, and outline some of the most surprising discoveries: gamma-ray flares from the Crab Nebula, detection of HE emission from Cygnus X-1 and Cygnus X-3 in coincidence with special spectral states, identification of an unambiguous signature for hadronic cosmic rays in Supernova Remnants, very intense flaring from a class of Active Galactic Nuclei. AGILE is very actively continuing to observe the gamma-ray sky with very fast processing and alert capability for transient sources. Particular emphasis is now given to the study of the transient gamma-ray activity (possibly) associated with Galactic binaries, such as the “hidden” black hole system MWC 656 that was recently discovered thanks to an AGILE detection.

Primary author: Dr PIANO, Giovanni (INAF-IAPS Roma)

Presenter: Dr PIANO, Giovanni (INAF-IAPS Roma)

Session Classification: Parallel Session J

Contribution ID: **188**Type: **oral**

The latest Galactic science results from VHE observations with H.E.S.S.

Wednesday, 1 October 2014 15:10 (20 minutes)

After a decade-long survey of the Galactic plane, the H.E.S.S. telescopes have amassed an unprecedented VHE gamma-ray dataset that continues to reveal new insights into the Galaxy at TeV energies. A 28-m class telescope was recently added to the now 5-telescope array, making it the first hybrid system in VHE astronomy. The upgrade further enhances the detection capabilities of H.E.S.S. and significantly reduces the energy threshold down to ~ 30 GeV. In this presentation, the latest Galactic results will be presented, including: the discovery of a population of VHE gamma-ray emitters in the Large Magellanic Cloud; the discovery of the remarkably hard spectrum source HESS J1641-463; and the first VHE observations of the unique supernova remnant Puppis A. Finally, the most recent results from observations with the new 28-m telescope will be shown.

Primary author: CHAVES, Ryan (LUPM/CNRS)

Presenter: CHAVES, Ryan (LUPM/CNRS)

Session Classification: Parallel Session F

Contribution ID: **189**Type: **oral**

Gamma-ray, neutrino and antiproton fluxes from TeV Dark Matter at the Galactic Center.

Thursday, 2 October 2014 15:00 (20 minutes)

I will show that the collection of data of the years 2004, 2005 and 2006 of the gamma-ray flux observed by HESS from the J1745-290 Galactic Center source is well fitted as the secondary gamma-ray photons generated from Dark Matter annihilating into Standard Model particles in combination with a simple power law background. The model independent fits are performed for all the possible channels of annihilation. The best fits are obtained for the $u\bar{u}$ and $d\bar{d}$ quark channels and for the $W+W^-$ and ZZ gauge boson, with background spectral index compatible with the Fermi-LAT data. I will show that this possibility can be tested with the observations of other cosmic-rays. So far, TeV DM masses are practically unconstrained by direct detection searches or colliders experiments.

Primary author: Ms GAMMALDI, Viviana (Universidad Complutense Madrid (UCM))

Presenter: Ms GAMMALDI, Viviana (Universidad Complutense Madrid (UCM))

Session Classification: Parallel Session J

Contribution ID: **190**Type: **oral**

Direct detection of Dark Matter

Friday, 3 October 2014 12:20 (35 minutes)

An overview of the latest results of Dark Matter direct detection will be discussed, with particular care to the DAMA/LIBRA-phase1 results and the evidence with high confidence level obtained by exploiting the model independent Dark Matter annual modulation signature for the presence of Dark Matter particles in the galactic halo. Results from other experiments using different procedures, different techniques and different target-materials will be discussed. Results, implications and experimental perspectives will be addressed.

Primary author: BELLI, Pierluigi (ROMA2)

Presenter: BELLI, Pierluigi (ROMA2)

Session Classification: VIII Plenary session

Contribution ID: **192**

Type: **not specified**

Welcome

Tuesday, 30 September 2014 09:30 (10 minutes)

Presenter: PIATTELLI, Paolo (LNS)

Session Classification: Welcome addresses