

Perspectives in Astroparticle physics from High Energy Neutrinos



Report of Contributions

Contribution ID: 0

Type: **Talk (20'+5')**

Neutrinos from Gamma-Ray Bursts, and tests of the UHECR paradigm

Monday, 25 September 2017 14:20 (25 minutes)

Gamma-ray bursts (GRBs) are the most energetic electromagnetic outburst class in the Universe, and candidates for the sources of the ultra-high energy cosmic rays (UHECRs). We discuss the neutrino flux associated with the prompt emission from GRBs, such as its possible contribution to the observed astrophysical neutrino flux, and we show the implications of recent stacking searches for neutrino production models in GRBs. Finally, we address the question if GRBs can be the sources of the UHECRs in light of recent Auger observations pointing towards nuclei at the highest energies, and the role of neutrinos to test this paradigm.

Primary author: Dr WINTER, Walter (DESY)**Presenter:** Dr WINTER, Walter (DESY)**Session Classification:** Astrophysical sources and Backgrounds & Multimessenger physics**Track Classification:** Astrophysical sources and backgrounds

Contribution ID: 1

Type: **Talk (20'+5')**

Multimessenger Aspects of Cosmic Neutrinos

Monday, 25 September 2017 15:35 (25 minutes)

The recent observation of TeV-PeV neutrinos by IceCube has opened a new window to the high-energy Universe. These high-energy astrophysical neutrinos are expected to originate from cosmic-ray interactions with gas and radiation. The origin of the IceCube signal is presently unknown and various Galactic and extragalactic source candidates have been proposed. Multi-messenger studies can help to decipher the underlying mechanisms of particle acceleration, propagation and production. I will highlight in my talk various source scenarios and will discuss multi-messenger constraints from cosmic-ray and gamma-ray observations.

Primary author: Dr AHLERS, Markus (UW-Madison)

Presenter: Dr AHLERS, Markus (UW-Madison)

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Multimessenger physics

Contribution ID: 2

Type: **Talk (20'+5')**

Status and prospects of the IceCube neutrino telescope

Monday, 25 September 2017 10:45 (25 minutes)

IceCube is the world's most sensitive neutrino telescope located at the geographic South Pole. With the discovery of a flux of high-energy cosmic neutrinos it has opened a new window for astronomy. Neutrinos allow to study the most extreme environments of our universe even in regions from which photons cannot escape, and help to understand the mechanisms of particle acceleration in the cosmos. I will review recent findings of IceCube and what they tell us about the origin of the cosmic neutrinos. An outlook will be given on how the field of neutrino astronomy could evolve with a new generation of neutrino telescopes that could become operational in the next decade.

Primary author: Dr ACKERMANN, Markus (DESY)**Presenter:** Dr ACKERMANN, Markus (DESY)**Session Classification:** High-energy neutrino observations and perspectives**Track Classification:** High-energy neutrino observations and perspectives

Contribution ID: 3

Type: **Talk (20'+5')**

High energy cosmic rays and the production of cosmogenic neutrinos and gamma-rays

Monday, 25 September 2017 17:30 (25 minutes)

We review the main features of ultra high energy cosmic rays propagation and the production of secondary cosmogenic particles such as neutrinos and gamma rays. We discuss the capabilities of the present and future observatories in the detection of these secondary particles, that has a paramount importance in constraining models for ultra high energy cosmic rays acceleration.

Primary author: ALOISIO, Roberto (Gran Sasso Science Institute)

Presenter: ALOISIO, Roberto (Gran Sasso Science Institute)

Session Classification: Multimessenger physics & New physics at high-energy neutrino telescopes

Track Classification: Multimessenger physics

Contribution ID: 4

Type: **Talk (20'+5')**

Particle physics with neutrino telescopes

Monday, 25 September 2017 11:35 (25 minutes)

Large-scale neutrino telescopes offer interesting possibilities to address particle physics topics ranging from particle searches to neutrino oscillations or tests of fundamental laws. They can even do so at energy ranges not accessible to accelerators, providing a much desired complementarity to accelerator-based physics.

I will review recent results from the existing high-energy neutrino telescopes on searches for dark matter, monopoles, signatures for TeV gravity and extra dimensions, tests of Lorentz invariance and neutrino oscillations, among other topics.

Primary author: DE LOS HEROS, Carlos (Uppsala University)

Presenter: DE LOS HEROS, Carlos (Uppsala University)

Session Classification: High-energy neutrino observations and perspectives

Track Classification: High-energy neutrino observations and perspectives

Contribution ID: 5

Type: **Talk (20'+5')**

Interpreting the IceCube neutrinos by decaying heavy DM

Monday, 25 September 2017 18:20 (25 minutes)

I will discuss the possibility to interpret the IceCube data by PeV mass scale decaying Dark Matter. The generic signatures of this scenario, including its energy spectrum as well as the peculiar anisotropies will be discussed. Also possible future checks of this scenario by EAS experiments, both by detecting the prompt gamma ray flux from decaying dark matter, or the induced anisotropies in the cosmic ray flux will be mentioned. I will also discuss possible improvements of the fit to IceCube data by considering a DM contribution in addition to the astrophysical power-law flux.

Primary author: Dr ESMAILI, Arman (Pontifícia Universidade Católica do Rio de Janeiro)

Co-author: Dr SERPICO, Pasquale Dario (CNRS, Laboratoire d'Annecy-le-Vieux de Physique Théorique (LAPTh), France)

Presenter: Dr ESMAILI, Arman (Pontifícia Universidade Católica do Rio de Janeiro)

Session Classification: Multimessenger physics & New physics at high-energy neutrino telescopes

Track Classification: New physics at high-energy neutrino telescopes

Contribution ID: 6

Type: **Talk (20'+5')**

Expectations for high energy diffuse galactic neutrinos for different cosmic ray distributions

Tuesday, 26 September 2017 14:55 (25 minutes)

The interaction of cosmic rays with the gas contained in our Galaxy is a guaranteed source of diffuse high energy neutrinos. We provide expectations for this component by considering different assumptions for the cosmic ray distribution in the Galaxy which are intended to cover the large uncertainty in cosmic ray propagation models. We calculate the angular dependence of the diffuse galactic neutrino flux and the corresponding rate of High Energy Starting Events in IceCube by including the effect of detector angular resolution. Moreover we discuss the possibility to discriminate the galactic component from an isotropic astrophysical flux. We show that a statistically significant excess of events from the galactic plane in present IceCube data would disfavour models in which the cosmic ray density is uniform, thus bringing relevant information on the cosmic ray radial distribution. We finally consider the constraints on the high energy galactic neutrino flux arising from gamma observations at TeV energies.

Primary author: VILLANTE, Francesco Lorenzo (AQ)**Co-authors:** EVOLI, Carmelo (GSSI); PAGLIAROLI, Giulia (GSSI)**Presenter:** VILLANTE, Francesco Lorenzo (AQ)**Session Classification:** Astrophysical sources and backgrounds**Track Classification:** Astrophysical sources and backgrounds

Contribution ID: 7

Type: **Talk (20'+5')**

A consistent model for leptogenesis, dark matter and the IceCube signal

Tuesday, 26 September 2017 11:45 (25 minutes)

We discuss a left-right symmetric extension of the Standard Model in which the three additional right-handed neutrinos play a central role in explaining the baryon asymmetry of the Universe, the dark matter abundance and the ultra energetic signal detected by the IceCube experiment. The energy spectrum and neutrino flux measured by IceCube are ascribed to the decays of the lightest right-handed neutrino N_1 , thus fixing its mass and lifetime, while the production of N_1 in the primordial thermal bath occurs via a freeze-in mechanism driven by the additional $SU(2)_R$ interactions. The constraints imposed by IceCube and the dark matter abundance allow nonetheless the heavier right-handed neutrinos to realize a standard type-I seesaw leptogenesis, with the $B - L$ asymmetry dominantly produced by the next-to-lightest neutrino N_2 . Further consequences and predictions of the model are that: the N_1 production implies a specific power-law relation between the reheating temperature of the Universe and the vacuum expectation value of the $SU(2)_R$ triplet; leptogenesis imposes a lower bound on the reheating temperature of the Universe at 7×10^9 GeV. Additionally, the model requires a vanishing absolute neutrino mass scale $m_1 \simeq 0$.

Primary author: Dr NIRO, Viviana (ITP, Heidelberg)**Presenter:** Dr NIRO, Viviana (ITP, Heidelberg)**Session Classification:** New physics at high-energy neutrino telescopes**Track Classification:** New physics at high-energy neutrino telescopes

Contribution ID: 8

Type: **Talk (20'+5')**

High energy neutrino astronomy: What have we learned?

Monday, 25 September 2017 13:30 (25 minutes)

The detection of high energy extra-terrestrial neutrinos by IceCube opens a new window for observations of the Universe. I will discuss the origin of these neutrinos, the clues that their detection provide towards the solution of the long standing question of the origin of cosmic-rays, and the prospects for identifying the cosmic-ray sources and for studying open questions in astro- and particle- physics using combined electromagnetic and neutrino observations.

Primary author: Prof. WAXMAN, Eli (Weizmann Institute)

Presenter: Prof. WAXMAN, Eli (Weizmann Institute)

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Astrophysical sources and backgrounds

Contribution ID: 9

Type: **Talk (20'+5')**

Status of the ANTARES neutrino telescope and KM3NeT perspectives

Monday, 25 September 2017 11:10 (25 minutes)

ANTARES, the largest underwater neutrino telescope in the Northern Hemisphere, has been continuously operating since 2007 in the Mediterranean Sea. The transparency of the water allows for a very good angular resolution in the reconstruction of signatures of interactions from neutrinos of all flavors. This results in unprecedented sensitivity for neutrino source searches in the Southern Sky at TeV energies, so that valuable constraints can be set on the origin of the cosmic neutrino flux discovered by the IceCube detector.

Other physics topics are addressed as well, that include e.g. setting constraints on dark matter from a search of neutrinos from potential dark matter annihilation in massive objects like the Sun and the Galactic Center.

Building on the successful experience of ANTARES the next generation KM3NeT neutrino telescope is now under construction in the Mediterranean Sea to significantly boost the sensitivity. Two detectors with the same technology but different granularity are under construction at two sites and will focus on high energy cosmic neutrinos (ARCA with Gton instrumented volume, offshore Capo Passero, Italy) and on atmospheric neutrinos at low energies down to a GeV to address atmospheric neutrino oscillations (ORCA with Mtons instrumented volume, offshore Toulon, France). With the completed KM3NeT/ARCA detector the cosmic IceCube neutrino flux can already be observed within a year of operation at 5 sigma level and the current estimates show that most promising galactic sources are detectable at 3 sigma level within five years. The connections to external observatories as existing for ANTARES already will be further expanded for KM3NeT and contribute to optimally exploit multi-messenger information.

The presentation will provide an overview on the newest results from Antares and an outlook towards the exciting science potential of KM3NeT.

Primary author: Ms SAMTLEBEN, Dorothea (NIKHEF, Amsterdam)

Presenter: Ms SAMTLEBEN, Dorothea (NIKHEF, Amsterdam)

Session Classification: High-energy neutrino observations and perspectives

Track Classification: High-energy neutrino observations and perspectives

Contribution ID: 10

Type: **Talk (20'+5')**

Experiments on satellites : status and future perspectives in connection with Neutrinos experiments

Tuesday, 26 September 2017 09:50 (25 minutes)

Measurement of cosmic rays and gamma rays made with satellites can give very useful information on present and future High Energy Neutrinos data. Here we will review the most important connections

Primary author: MORSELLI, Aldo (ROMA2)

Presenter: MORSELLI, Aldo (ROMA2)

Session Classification: High-energy neutrino observations and perspectives

Track Classification: High-energy neutrino observations and perspectives

Contribution ID: 11

Type: **Talk (20'+5')**

The prompt atmospheric neutrino flux

Monday, 25 September 2017 13:55 (25 minutes)

The atmospheric neutrino flux is produced when cosmic rays collide with Earth's atmosphere. At very high energy, the prompt contribution to the neutrino flux, which comes from decays of charmed hadrons, dominates over the conventional flux, which comes from pion and kaon decays. This is due to the very short lifetime of the charmed hadrons, which therefore do not lose energy before they decay.

The calculation of this process is challenging because the Bjorken- x at which the parton distribution functions are evaluated is very small. This is a region where QCD is not well understood, and large logarithms must be resummed. Available parton distribution functions are not known at such small x and extrapolations must be made. Theoretically, the fast rise of the structure functions for small x should ultimately lead to parton saturation effects.

I will discuss the calculation of the prompt atmospheric neutrino flux at high energies, performed by several groups recently, comparing three different frameworks for calculating the heavy quark production cross section in QCD: NLO perturbative QCD, k_T factorization including low- x resummation, and the dipole model including parton saturation. These calculations can nowadays be constrained by RHIC and LHC data, especially forward charm meson production from LHCb at both 7 TeV and at 13 TeV. I will also discuss the effect of nuclear shadowing, which may decrease the prompt flux by 10% to 50% at the highest energies.

Primary author: Dr ENBERG, Rikard (Uppsala University)

Presenter: Dr ENBERG, Rikard (Uppsala University)

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Astrophysical sources and backgrounds

Contribution ID: 12

Type: **Talk (20'+5')**

Looking for sources of astrophysical neutrinos

Tuesday, 26 September 2017 15:20 (25 minutes)

In this talk I'll discuss significance of the galactic component observation in the 4 years IceCube data. Also I'll review theoretical models, which can explain observed data both with Galactic and extra-galactic sources of neutrinos. In particular, I'll present model which at the same time explain UHECR and astrophysical neutrinos.

Primary author: SEMIKOZ, Dmitri (APC, Paris)**Presenter:** SEMIKOZ, Dmitri (APC, Paris)**Session Classification:** Astrophysical sources and backgrounds**Track Classification:** Astrophysical sources and backgrounds

Contribution ID: 13

Type: **Talk (20'+5')**

The neutrino role in multi-messenger strategies

Tuesday, 26 September 2017 09:00 (25 minutes)

New windows in the study of the high-energy universe have been opened by large volume detectors in underground laboratories or underwater/ice, huge surface shower arrays, particle detectors sent into space and by gravitational wave interferometers. Neutrino observations play a central role in multi-messenger strategies in astrophysics, cosmology and particle physics. The talk intends to survey the status of on-going strategy to connect traditional astronomical observation with the detection of neutrinos and other cosmic probes: charged cosmic-rays, GeV and TeV gamma-rays, gravitational waves.

Primary author: SPURIO, Maurizio (BO)**Presenter:** SPURIO, Maurizio (BO)**Session Classification:** High-energy neutrino observations and perspectives**Track Classification:** High-energy neutrino observations and perspectives

Contribution ID: 14

Type: **Talk (20'+5')**

Cosmic ray hardening in the inner Galaxy and its gamma-ray and neutrino imprints

Tuesday, 26 September 2017 16:50 (25 minutes)

The Galaxy is a guaranteed source of neutrinos produced by the interaction of cosmic rays (CRs) with the interstellar gas. According to conventional CR propagation models, however, this emission may be too weak to be detected even by Km3-scale neutrino telescopes. This expectation has to be revisited in the light of recent Fermi-LAT findings showing that the CR spectrum in the inner Galactic plane is significantly harder than that inferred from local CR measurements. Here we present some relevant predictions of a phenomenological model –assuming spatially-dependent CR diffusion –which was recently developed to reproduce that large-scale trend. In particular, we show that our model correctly predicts the TeV γ -ray diffuse emission measured by Milagro and H.E.S.S. in the inner Galaxy and Galactic Center (GC) region respectively. The implications of our findings for the possible presence of a PeVatron in the GC will be also discussed. In another talk of this conference A. Marinelli may present our results of the computation of the corresponding neutrino emission and compare them with available experimental results by ANTARES and IceCube.

Primary authors: Mr URBANO, Alfredo Leonardo (CERN); MARINELLI, Antonio (PI); Dr GAGGERO, Daniele (GRAPPA, university of Amsterdam); GRASSO, Dario (PI); Dr TAOSO, Marco (IFT CSIC Madrid)

Presenter: GRASSO, Dario (PI)

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Astrophysical sources and backgrounds

Contribution ID: 15

Type: **Talk (20'+5')**

On the high-energy IceCube neutrinos

Tuesday, 26 September 2017 12:10 (25 minutes)

The discovery of the high-energy neutrino flux by the IceCube detector has motivated a large number of studies in the literature to unravel their origin, from different scenarios within standard cosmic-ray sources to more exotic possibilities. In this talk, I will describe the evolution of the HESE data of IceCube and their main features and I will present the results of statistical analyses of different scenarios.

Primary author: Dr PALOMARES-RUIZ, Sergio (IFIC (UV-CSIC))

Presenter: Dr PALOMARES-RUIZ, Sergio (IFIC (UV-CSIC))

Session Classification: New physics at high-energy neutrino telescopes

Track Classification: New physics at high-energy neutrino telescopes

Contribution ID: 16

Type: **Talk (20'+5')**

Diffuse high energy neutrino factories in our Galaxy

Tuesday, 26 September 2017 17:15 (25 minutes)

In this work we present a detailed study of the high-energy neutrino flux expectation from different diffuse regions of our Galaxy, like the Central Molecular Zone (CMZ), the Galactic Ridge and the Fermi Bubbles. The TeV gamma-ray observations from the mentioned regions, suggest a careful modeling of this guaranteed neutrino factories. We consider a recently introduced cosmic-ray transport model motivated by the Fermi-LAT diffuse gamma-ray data, and compute the expected neutrino emission from the mentioned regions. In addition to the last catalog (PASS8) of Fermi-LAT data we consider also the last observations of H.E.S.S. and HAWC experiments to constrain the presented models. We eventually compare our predictions with the results obtained by Ice-Cube and ANTARES telescopes and underline the importance of having a future KM3NeT/ARCA observatory.

Primary author: MARINELLI, Antonio (PI)**Co-authors:** Dr GAGGERO, Daniele (GRAPPA, university of Amsterdam); GRASSO, Dario (PI)**Presenter:** MARINELLI, Antonio (PI)**Session Classification:** Astrophysical sources and Backgrounds & Multimessenger physics**Track Classification:** Astrophysical sources and backgrounds

Contribution ID: 17

Type: **Talk (20'+5')**

PeV neutrinos, gamma rays, and cosmic rays from distant blazars

Monday, 25 September 2017 15:10 (25 minutes)

Observed spectra of distant blazars show evidence of secondary gamma rays from interactions of cosmic rays with extragalactic photon radiation (EBL and CMB). The same interactions of cosmic rays are expected to produce a flux of neutrinos with energies peaked around 1 PeV. The spectrum and the isotropic distribution are consistent with IceCube observations. This association also implies that AGN can accelerate cosmic rays to EeV energies.

Primary author: Prof. KUSENKO, Alexander (UCLA and Kavli IPMU)

Presenter: Prof. KUSENKO, Alexander (UCLA and Kavli IPMU)

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Multimessenger physics

Contribution ID: 21

Type: **Talk (20'+5')**

Extreme blazars as counterparts of extreme messengers

Monday, 25 September 2017 14:45 (25 minutes)

Presenter: Prof. RESCONI, Elisa

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Astrophysical sources and backgrounds

Contribution ID: 22

Type: **Talk (20'+5')**

Future Wide Field of View Experiments: from Gamma-Ray Astronomy to Cosmic Rays

Monday, 25 September 2017 16:40 (25 minutes)

The riddle of the origin of Cosmic Rays is unsolved since more than one century. The identification of the galactic sources able to accelerate particles beyond PeV energies is certainly one of the main open problems of high energy astrophysics. High energy gamma ray (and neutrino) observations are an essential probe of CRs, if gamma rays (and neutrinos) are produced by CRs interacting close to their sources. The integrated study of charged CRs, gamma rays and neutrinos is one of the most important and exciting fields in the so-called 'multi-messenger astronomy'. Open problems in cosmic ray physics push the construction of a new generation of EAS arrays to study, in the $10^{11} - 10^{18}$ eV energy range, photon- and charged-induced events at the same time. LHAASO is the most ambitious project for a new generation multi-component wide field-of-view experiment in the Northern hemisphere. A new EAS array in the Southern Hemisphere to study the 100 GeV γ -sky with high sensitivity and to monitor the Galactic Center should be a high priority. In this contribution the prospects of TeV gamma-ray observations with new ground-based wide field-of-view detectors are presented.

Presenter: DI SCIASCIO, Giuseppe (ROMA2)

Session Classification: Multimessenger physics & New physics at high-energy neutrino telescopes

Track Classification: Multimessenger physics

Contribution ID: 23

Type: **Talk (20'+5')**

UHECRs & Neutrinos

Monday, 25 September 2017 17:05 (25 minutes)

Presenter: Prof. ZAS, Enrique (IGFAE - University of Santiago)

Session Classification: Multimessenger physics & New physics at high-energy neutrino telescopes

Track Classification: Multimessenger physics

Contribution ID: 24

Type: **Talk (20'+5')**

PeV Neutrinos from Heavy Relic Decays in Early Universe

Monday, 25 September 2017 17:55 (25 minutes)

Presenter: Prof. MOROI, Takeo

Session Classification: Multimessenger physics & New physics at high-energy neutrino telescopes

Track Classification: New physics at high-energy neutrino telescopes

Contribution ID: 26

Type: **Talk (20'+5')**

HE neutrino detection with acoustic and radio techniques: a state of the art summary

Tuesday, 26 September 2017 09:25 (25 minutes)

Presenter: RICCOBENE, Giorgio Maria (LNS)

Session Classification: High-energy neutrino observations and perspectives

Track Classification: High-energy neutrino observations and perspectives

Contribution ID: 28

Type: **Talk (20'+5')**

Probing origin of matter from RH neutrinos with IceCube

Tuesday, 26 September 2017 11:20 (25 minutes)

Presenter: DI BARI, Pasquale (University of Southampton)

Session Classification: New physics at high-energy neutrino telescopes

Track Classification: New physics at high-energy neutrino telescopes

Contribution ID: 29

Type: **Talk (20'+5')**

IceCube spectral anomaly

Tuesday, 26 September 2017 14:30 (25 minutes)

Presenter: Dr VISSANI, Francesco (Gssi)

Session Classification: Astrophysical sources and backgrounds

Track Classification: Astrophysical sources and backgrounds

Contribution ID: 32

Type: **Talk (20'+5')**

Gravitational Waves: An Entire New Window on to the Cosmos

Tuesday, 26 September 2017 17:40 (25 minutes)

Presenter: Dr DI PALMA, Irene (ROMA1)

Session Classification: Astrophysical sources and Backgrounds & Multimessenger physics

Track Classification: Multimessenger physics

Contribution ID: 33

Type: **Talk (20'+5')**

Sensitivity for tau neutrinos at PeV energies and beyond with the MAGIC telescopes

Tuesday, 26 September 2017 10:15 (25 minutes)

The MAGIC telescopes, located at the Roque de los Muchachos Observatory (2200 a.s.l.) in the Canary Island of La Palma, are placed on the top of a mountain, from where a window of visibility of about 5° in zenith and 80° in azimuth is open in the direction of the surrounding ocean. This allows to search for a signature of particle showers induced by earth-skimming cosmic tau neutrinos in the PeV to EeV energy range arising from the ocean.

We have studied the response of MAGIC to such events, employing Monte Carlo simulations of upward-going tau neutrino showers. The analysis of the shower images shows that air showers induced by tau neutrinos can be discriminated from the background of very inclined hadronic showers. We have calculated the point source acceptance and the expected event rates, assuming an incoming tau neutrino flux consistent with IceCube measurements, and for a sample of generic neutrino fluxes from photo-hadronic interactions in AGNs. The analysis of 30 hours of MAGIC data taken towards the sea leads to a sensitivity to tau neutrinos of the same order of the down-going point source study of the Pierre Auger Observatory, but is less sensitive than the diffuse study of the IceCube Experiment.

Primary author: Dr GORA, Dariusz (Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland)

Co-authors: SOBCZYNSKA, Dorota (University of Lodz, PL-90236 Lodz, Poland); Prof. BERNARDINI, Elisa (Humboldt University of Berlin, Institut fuer Physik Newtonstr. 15, 12489 Berlin Germany/Deutsches Elektronen-Synchrotron (DESY), D-15738 Zeuthen, Germany); RICO, Javier (Institut de Fisica d'Altes Energies (IFAE), The Barcelona Institute of Science and Technology, Campus UAB, 08193 Bellaterra (Barcelona), Spain); Dr MANGANARO, Marina (IAC and ULL Tenerife); WILL, Martin (Inst. de Astrofísica de Canarias, E-38200 La Laguna, Tenerife, Spain/Universidad de La Laguna, Dpto. Astrofísica, E-38206 La Laguna, Tenerife, Spain); DORO, Michele (Universita di Padova and INFN, I-35131 Padova, Italy); LOMBARDI, Saverio (INAF National Institute for Astrophysics, I-00136 Rome, Italy)

Presenter: Dr GORA, Dariusz (Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland)

Session Classification: High-energy neutrino observations and perspectives

Track Classification: Multimessenger physics

Contribution ID: 34

Type: **Talk (20'+5')**

IceCube: Building a New Window on the Universe

Monday, 25 September 2017 10:20 (25 minutes)

The IceCube project has transformed a cubic kilometer of natural Antarctic ice into a neutrino detector. The instrument detects more than 100,000 neutrinos per year in the GeV-to-PeV energy range. Among those, we have isolated a flux of high-energy cosmic neutrinos. I will discuss the latest measurements of the cosmic neutrino flux and their implications for its possible origin(s). From the large cosmic flux observed, we conclude that the energy density of neutrinos in the extreme Universe is similar to that of photons. It is therefore evident that the prospects for neutrino astronomy are exceptional and the case for next-generation instruments compelling.

Primary author: Prof. HALZEN, Francis (University of Wisconsin Madison)

Presenter: Prof. HALZEN, Francis (University of Wisconsin Madison)

Session Classification: High-energy neutrino observations and perspectives

Track Classification: High-energy neutrino observations and perspectives

Contribution ID: 35

Type: **Talk (20'+5')**

Minimal models for extragalactic cosmic rays and neutrinos

Tuesday, 26 September 2017 15:45 (25 minutes)

I review attempts to explain in a unified way the experimental data on ultrahigh energy neutrinos and cosmic rays, using a single source class and obeying data on CR composition and limits on the extragalactic diffuse gamma-ray background.

Primary author: KACHELRIESS, Michael (NTNU)

Presenter: KACHELRIESS, Michael (NTNU)

Session Classification: Astrophysical sources and backgrounds

Track Classification: Astrophysical sources and backgrounds

Contribution ID: 36

Type: **Talk (20'+5')**

Neutrino lines produced by DM annihilation: a model-building perspective for neutrino telescopes

Tuesday, 26 September 2017 12:35 (25 minutes)

In the near future, neutrino telescopes are expected to improve their sensitivity to the flux of monochromatic neutrinos produced by dark matter (DM) in our galaxy. This is illustrated by a new limit on the corresponding cross section that we derive from public IceCube data. In this context, we study which DM models could produce an observable flux of monochromatic neutrinos from DM annihilations. To this end, we proceed in two steps. First, within a set of simple and minimal assumptions concerning the properties of the DM particle, we determine the models that could give rise to a significant annihilation into monochromatic neutrinos at the freeze-out epoch. The list of models turns out to be very limited as a result of various constraints, in particular direct detection and neutrino masses at loop level. Given the fact that, even if largely improved, the sensitivities will be far from reaching the thermal annihilation cross section soon, a signal could only be observed if the annihilation into neutrinos today is boosted with respect to the freeze-out epoch. This is why, in a second step, we analyze the possibility of having such a large enhancement from the Sommerfeld effect. For each scenario, we also compute the cross sections into other annihilation products and confront our results with experimental constraints. We find that, within our simple and minimal assumptions, the expectation to observe monochromatic neutrinos is only possible in very specific scenarios. Some will be confirmed or excluded in the near future because they predict signals slightly below the current experimental sensitivities. We also discuss how these prospects change by relaxing our assumptions as well as by considering other types of sharp spectral features. For the latter, we consider boxed-shaped and bremsstrahlung spectra and provide the corresponding limits from IceCube data.

Primary author: Prof. HAMBYE, Thomas**Presenter:** Prof. HAMBYE, Thomas**Session Classification:** New physics at high-energy neutrino telescopes**Track Classification:** New physics at high-energy neutrino telescopes

Contribution ID: **39**

Type: **not specified**

Welcome

Contribution ID: 43

Type: **Poster**

Extending the search for high-energy muon neutrinos from GRBs with ANTARES

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: CELLI, Silvia (Gran Sasso Science Institute)

Session Classification: Poster Session

Contribution ID: 44

Type: **Poster**

Interpreting IceCube 6-year HESE data as an evidence for hundred TeV decaying Dark Matter

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: CHIANESE, Marco (NA)

Session Classification: Poster Session

Contribution ID: 45

Type: **Poster**

Use of ANTARES and IceCube data to constrain single power-law neutrino flux

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: MELE, Rosa (N)

Session Classification: Poster Session

Contribution ID: 46

Type: **Poster**

The contribution of galactic sources to the diffuse high-energy neutrinos signal

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: PAGLIAROLI, Giulia (GSSI)

Session Classification: Poster Session

Contribution ID: 47

Type: **Poster**

POCAM: The Precision Optical CALibration Module for IceCube-Gen2: first prototype

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: Ms REA, Immacolata Carmen (TUM)

Session Classification: Poster Session

Contribution ID: 48

Type: **Poster**

Cosmic neutrino oscillations and tau neutrino in IceCube

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: MASCARETTI, Carlo (GSSI)

Session Classification: Poster Session

Contribution ID: 49

Type: **Poster**

Spin, Torsion and NEC in Traversable Wormholes

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: Dr MANFREDONIA, Mattia (Dipartimento di Fisica Ettore Pancini, Universita' di Napoli Federico II)

Session Classification: Poster Session

Contribution ID: 50

Type: **Poster**

Probing neutrino oscillations with large volume telescopes

Tuesday, 26 September 2017 19:00 (1 hour)

Presenter: FERNANDEZ DE SALAS, Pablo (IFIC (CSIC - UV))

Session Classification: Poster Session