NBIA Summer School on Neutrinos: Here, There & Everywhere

Here, There & Everywhere

PhD Summer School on Neutrinos

July 17-21, 2023

Niels Bohr Institute, Copenhagen

Report of Contributions

https://indico.nbi.ku.dk/e/1961

Contribution ID: **4** Type: **not specified**

Farewell & Intro of Niels Bohr Archive

Friday, 21 July 2023 11:30 (30 minutes)

Contribution ID: **28** Type: **Oral**

Welcome

Monday, 17 July 2023 09:15 (15 minutes)

Contribution ID: **29** Type: **Oral**

Farewell

Session Classification: Guided Tour by Niels Bohr Archive

Contribution ID: **57** Type: **Oral**

Lecture I

Monday, 17 July 2023 11:00 (1 hour)

Primary author: WINTER, Walter (Deutsches Elektronen-Synchrotron (DESY))

Presenter: WINTER, Walter (Deutsches Elektronen-Synchrotron (DESY))

Session Classification: Neutrino Astrophysics & Astronomy

Contribution ID: **58** Type: **Oral**

Lecture II

Tuesday, 18 July 2023 09:30 (1 hour)

Primary author: WINTER, Walter (Deutsches Elektronen-Synchrotron (DESY))

Presenter: WINTER, Walter (Deutsches Elektronen-Synchrotron (DESY))

Session Classification: Neutrino Astrophysics & Astronomy

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

Lecture III

Thursday, 20 July 2023 11:00 (1 hour)

Primary author: WINTER, Walter (Deutsches Elektronen-Synchrotron (DESY))

Presenter: WINTER, Walter (Deutsches Elektronen-Synchrotron (DESY))

Session Classification: Neutrino Astrophysics & Astronomy

Contribution ID: **60** Type: **Oral**

Lecture I

Monday, 17 July 2023 09:30 (1 hour)

Primary author: BARENBOIM, Gabriela (University of Valencia & IFIC (UV-CSIC))

Presenter: BARENBOIM, Gabriela (University of Valencia & IFIC (UV-CSIC))

Session Classification: Neutrino Theory & Phenomenology

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

Lecture II

Tuesday, 18 July 2023 11:00 (1 hour)

Primary author: BARENBOIM, Gabriela (University of Valencia & IFIC (UV-CSIC))

Presenter: BARENBOIM, Gabriela (University of Valencia & IFIC (UV-CSIC))

Session Classification: Neutrino Theory & Phenomenology

Contribution ID: **62** Type: **Oral**

Lecture III

Wednesday, 19 July 2023 09:30 (1 hour)

Primary author: BARENBOIM, Gabriela (University of Valencia & IFIC (UV-CSIC))

Presenter: BARENBOIM, Gabriela (University of Valencia & IFIC (UV-CSIC))

Session Classification: Neutrino Theory & Phenomenology

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

Lecture I

Wednesday, 19 July 2023 11:00 (1 hour)

Primary author: HANNESTAD, Steen (Aarhus University)

Presenter: HANNESTAD, Steen (Aarhus University)

Session Classification: Neutrino Cosmology

Contribution ID: **65** Type: **Oral**

Lecture II

Thursday, 20 July 2023 09:30 (1 hour)

Primary author: HANNESTAD, Steen (Aarhus University)

Presenter: HANNESTAD, Steen (Aarhus University)

Session Classification: Neutrino Cosmology

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

Lecture III

Friday, 21 July 2023 09:30 (1 hour)

Primary author: HANNESTAD, Steen (Aarhus University)

Presenter: HANNESTAD, Steen (Aarhus University)

Session Classification: Neutrino Cosmology

Contribution ID: **87** Type: **Oral**

Neutrino constraints from gamma-ray bursts

Wednesday, 19 July 2023 13:30 (30 minutes)

Primary author: RUDOLPH, Annika (Niels Bohr Institute, University of Copenhagen)

Presenter: RUDOLPH, Annika (Niels Bohr Institute, University of Copenhagen)

Session Classification: Topical Seminar

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

Coherent forward scattering of neutrinos

Friday, 21 July 2023 11:00 (30 minutes)

TBA

Primary author: SHALGAR, Shashank (NBIA)

Presenter: SHALGAR, Shashank (NBIA)

Session Classification: Topical Seminar

Contribution ID: **89** Type: **Oral**

Near-future discovery of point sources of ultra-high-energy neutrinos

Thursday, 20 July 2023 13:30 (30 minutes)

Presenter: FIORILLO, Damiano (Niels Bohr Institute, University of Copenhagen)

Session Classification: Topical Seminar

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

Improving CP Measurement with THEIA and Muon Decay at Rest

Wednesday, 19 July 2023 14:30 (15 minutes)

We explore the possibility of using the recently proposed THEIA detector to measure the $\bar{\nu}_\mu \to \bar{\nu}_e$ oscillation with neutrinos from a muon decay at rest (μDAR) source to improve the leptonic CP phase measurement. Due to its intrinsic low-energy beam, this μTHEIA configuration (μDAR neutrinos at THEIA) is only sensitive to the genuine leptonic CP phase δ_D and not contaminated by the matter effect. With detailed study of neutrino energy reconstruction and backgrounds at the THEIA detector, we find that the combination with the high-energy DUNE can significantly reduce the CP uncertainty, especially around the maximal CP violation cases $\delta_D = \pm 90°$. Both the μTHEIA-25 with 17 kt and μTHEIA-100 with 70 kt fiducial volumes are considered. For DUNE + μTHEIA-100, the CP uncertainty can be better than $8°$.

Primary author: KONG, Chui-Fan (Tsung-Dao Lee Institute)

Presenter: KONG, Chui-Fan (Tsung-Dao Lee Institute)

Session Classification: Student Talks

Contribution ID: **91** Type: **Oral**

Anomalies in the Radio Neutrino Observatory Greenland

Thursday, 20 July 2023 14:15 (15 minutes)

After two seasons of deployment, 7 stations built and many lessons learned, the Radio Neutrino Observatory Greenland (RNO-G) is now operational. In the coming years, the construction of another 28+ stations will bring the array to full capacity as an instrument with an eye towards the ultra-high energy neutrino (>10 PeV) regime, creating another link in the fast paced and rapidly changing landscape of multi-messenger astronomy. Until now, the data volume of our two initial seasons has remained manageable. However, as the array continues to grow, we need to develop more and more clever processes regarding how to filter our data; we must throw away the noise and identify the most promising events. Data reduction tools become crucial for anthropogenic, environmental and local noise identification/removal in order to test and monitor our instrument as we scale up. We present a convolutional encoder-decoder network that assigns an anomaly ranking to events, helping to classify different categories of background and signal.

Primary author: MEYERS, Zachary (DESY Zeuthen)

Presenter: MEYERS, Zachary (DESY Zeuthen)

Session Classification: Student Talks

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

The Role of Electromagnetic Cascades in High-Energy Neutrino Astrophysics

Thursday, 20 July 2023 14:30 (15 minutes)

High-energy gamma-rays do not travel freely across our Universe. Above the pair production threshold, they interact with background photon fields, giving rise to eletromagnetic cascades that take place over cosmological distances, and producing sub-TeV gamma-ray fluxes at the Earth. In this talk, we will demonstrate how one can use such cascades in a multimessenger context to infer properties of the IceCube astrophysical neutrino sources. We also explore the role of muon pair production in producing neutrinos along the development of ultra-high energy cascades, opening a potential window to probe cosmic accelerators at large redshifts.

Primary authors: CAPANEMA, Antonio (Pontifícia Universidade Católica do Rio de Janeiro); Prof. ESMAILI, Arman (Pontifícia Universidade Católica do Rio de Janeiro); Mr ESMAEILI, AmirFarzan (Pontifícia Universidade Católica do Rio de Janeiro); Prof. SERPICO, Pasquale (Laboratoire d'Annecy-le-Vieux de Physique Théorique)

Presenter: CAPANEMA, Antonio (Pontifícia Universidade Católica do Rio de Janeiro)

Session Classification: Student Talks

Contribution ID: **93** Type: **Oral**

Stochastic modelling of cosmic ray sources for diffuse high-energy gamma-rays and neutrinos

Thursday, 20 July 2023 14:45 (15 minutes)

Cosmic rays of energies up to a few PeV are believed to be of Galactic origin, yet individual sources have still not been firmly identified. Due to inelastic collisions with the interstellar gas, cosmic-ray nuclei produce a diffuse flux of high-energy gamma-rays and neutrinos. Fermi-LAT has provided maps of galactic gamma-rays at GeV energies which can be produced by both hadronic and leptonic processes. Neutrinos, on the other hand, are exclusively produced by the sought-after hadronic processes, yet they can be detected above backgrounds only at hundreds of TeV. Oftentimes, diffuse emission maps are extrapolated from GeV to PeV energies, but the sources contributing at either energies likely differ. We have modelled the production of diffuse emission from GeV through PeV energies in a Monte Carlo approach, taking into consideration the discrete nature of sources. We can generate realisations of the diffuse sky in a matter of seconds, thus allowing for characterising correlations in direction and energy. At hundreds of TeV, relevant for observations with LHAASO, Tibet AS-gamma, IceCube and the upcoming SWGO, variations between different realisations are sizeable. Specifically, we show that extrapolations of diffuse emission from GeV to PeV energies must fail and apply our results on the recent experimental findings.

Primary authors: STALL, Anton (Institute for Theoretical Particle Physics and Cosmology (TTK), RWTH Aachen University); Mr KAISER, Leonard (Institute for Theoretical Particle Physics and Cosmology (TTK), RWTH Aachen University); Prof. MERTSCH, Philipp (Institute for Theoretical Particle Physics and Cosmology (TTK), RWTH Aachen University)

Presenter: STALL, Anton (Institute for Theoretical Particle Physics and Cosmology (TTK), RWTH Aachen University)

Session Classification: Student Talks

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

Investigating high-energy neutrinos from blazars with an analysis of the IceCube observatory data

Tuesday, 18 July 2023 14:30 (15 minutes)

In the past decade, the IceCube observatory has established the presence of a diffuse flux of high-energy neutrinos (≥100 TeV to 10 PeV) that is consistent with an astrophysical origin. However, the population of sources responsible for this flux remains largely unknown.
Among the candidate sources of neutrinos, blazars have been suggested as promising emitters of the high-energy events detected by IceCube. A recent study has provided evidence of a statistically significant spatial correlation between blazars from the 5th Roma-BZCat catalog (5BZCat) and the IceCube data. In this contribution, we explore the findings from a complementary approach.

Primary author: BARBANO, Eleonora (Julius-Maximilians-Universität Würzburg, Fakultät für Physik und Astronomie, Emil-Fischer-Str. 31, D-97074 Würzburg, Germany)

Co-authors: Ms AZZOLLINI, Alessandra (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); Dr TRAMACERE, Andrea (University of Geneva, Switzerland); Dr FICHET DE CLAIRFONTAINE, Gaëtan (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); Dr ILLUMINATI, Giulia (University of Bologna, Italy); Mr OSWALD, Lenz (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); Mr PFEIFFER, Leonard (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); Prof. BUSON, Sara (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); Dr BAGHMANYAN, Vardan (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany)

Presenter: BARBANO, Eleonora (Julius-Maximilians-Universität Würzburg, Fakultät für Physik und Astronomie, Emil-Fischer-Str. 31, D-97074 Würzburg, Germany)

Session Classification: Student Talks

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

Exploring the dark Universe with gravitational waves

Monday, 17 July 2023 13:30 (30 minutes)

Primary author: EZQUIAGA, Jose Maria (Niels Bohr Institute)

Presenter: EZQUIAGA, Jose Maria (Niels Bohr Institute)

Session Classification: Topical Seminar

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

A First Look at Sky Anisotropies of High-Energy Neutrino Flavours

Thursday, 20 July 2023 14:00 (15 minutes)

High-energy astrophysical neutrinos, with TeV–PeV energies and cosmological-scale baselines, provide us with a unique opportunity to study fundemental physics. By looking for the differences in the distribution of arrival directions of neutrinos of different flavours, we can probe physics beyond the Standard Model that predicts directionally-varying flavour ratios under the reasonable assumption of directionally isotropic flavour ratios in astrophysical neutrino production. Using 7.5 years of IceCube High Energy Starting Events, we model a flavour-dependent spherical harmonic expansion of the neutrino flux and ground our predictions in realistic detector simulations. Further, we forecast the near-future reach of current and upcoming neutrino telescopes to constrain and detect these flavour anisotropies. We discuss the application of these predictions to constrain anisotropy-generating parameters, including those arising from Lorentz invarience violation, as well as flavour-dependant couplings of neutrinos to dark matter.

Primary authors: TELALOVIC, Bernanda (Niels Bohr Institute, University of Copenhagen); BUSTAMANTE, Mauricio (Niels Bohr Institute, University of Copenhagen)

Presenter: TELALOVIC, Bernanda (Niels Bohr Institute, University of Copenhagen)

Session Classification: Student Talks

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

Multi-messenger observations with the KM3NeT telescope: search for high energy neutrinos coinciding with fast radio bursts

Wednesday, 19 July 2023 14:00 (15 minutes)

The KM3NeT experiment is a next-generation neutrino telescope, consisting of two separate detection structures, organised as arrays of light sensors, and immersed in the depths of the Mediterranean Sea. The two detectors are the Oscillation Research with Cosmics in the Abyss (ORCA detector), located off the coast of France and the Astrophysics Research with Cosmics in the Abyss (ARCA detector), off the coast of Sicily. Identical in the design but differing by scale, these two detectors observe neutrino interactions in the sea water through Cherenkov light produced by the interaction products at different energy ranges. Specifically, ORCA aims at detecting atmospheric neutrinos to study their oscillation parameters, while ARCA will focus at higher energies on astrophysical neutrinos and the characterisation of their sources. Among the latter topic, Fast Radio Bursts (FRB) are good candidates for multi-messenger emissions due to the huge energy involved in their burst. I will present the method and criteria of a multi-messenger analysis intended to search for spatial and temporal coincidences of astrophysical neutrino signals from KM3NeT with a FRB catalogue of around 800 sources among which 14 have been observed in this period, ranging from January 2020 to March 2021, and were visible from the KM3NeT site.

Primary author: Mr BRETAUDEAU, Felix (on behalf of the KM3NeT Collaboration)

Presenter: Mr BRETAUDEAU, Felix (on behalf of the KM3NeT Collaboration)

Session Classification: Student Talks

Contribution ID: **98** Type: **Oral**

Towards xenon-doped liquid argon for LEGEND

Monday, 17 July 2023 14:15 (15 minutes)

The LEGEND collaboration is searching for neutrinoless double beta decay of Ge-76. To this end, high-purity Ge detectors are operated in an instrumented liquid argon volume, shielding them from external background radiation passively and actively via the emission of scintillation light upon interaction with ionizing radiation. While liquid argon scintillation detectors are an established and well-performing technology, they suffer from short emission wavelengths, long scintillation times, and only moderate attenuation lengths. Adding small amounts of xenon can enormously improve the scintillation properties.
Xenon-doped liquid argon features a higher photo-electron yield, a faster scintillation time profile, and a longer attenuation length than pure liquid argon. In this talk, I will present the current knowledge on xenon-doped liquid argon scintillation, its advantages and disadvantages, and its potential future impact on LEGEND.

Primary author: VOGL, Christoph (TU-Munich)

Presenter: VOGL, Christoph (TU-Munich)

Session Classification: Student Talks

Contribution ID: **99** Type: **Oral**

Studying the physical properties of the engines of neutrino-emitter blazars.

Tuesday, 18 July 2023 14:15 (15 minutes)

High-energy neutrinos detected by the IceCube Observatory provide an exclusive opportunity to study the origin of cosmic rays and the nature of the sources producing them. Blazars are among the proposed birthplaces for the astrophysical high-energy neutrinos. We focus on a small set of blazars that are likely counterparts to IceCube neutrinos.

In this contribution, we aim to inspect this sub-population of neutrino-emitter blazars to study the observational and physical properties that govern the physics of these objects and likely make them capable of accelerating cosmic rays. We will discuss our analysis approach and the general context of the properties displayed by the overall blazar population.

Primary author: AZZOLLINI, Alessandra (Julius-Maximilians Universität Würzburg)

Co-authors: Dr COLEIRO, Alexis (Université Paris Cité, CNRS, Astroparticule et Cosmologie); TRAMACERE, Andrea (University of Geneva, Switzerland); BARBANO, Eleonora (Julius-Maximilians-Universität Würzburg, Fakultät für Physik und Astronomie, Emil-Fischer-Str. 31, D-97074 Würzburg, Germany); FICHET DE CLAIRFONTAINE, Gaëtan (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); OSWALD, Lenz (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); PFEIFFER, Leonard (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); BUSON, Sara (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil-Fischer-St. 31, D-97074, Würzburg, Germany); Dr MARCHESI, Stefano (Istituto Nazionale di Astrofisica (INAF) Bologna, Italy); BAGHMANYAN, Vardan (Fakultät für Physik und Astronomie, Julius-Maximilians-Universität Würzburg, Emil--Fischer-St. 31, D-97074, Würzburg, Germany)

Presenter: AZZOLLINI, Alessandra (Julius-Maximilians Universität Würzburg)

Session Classification: Student Talks

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

Jet contribution to the ⊠-ray Flux in NGC 1068

Tuesday, 18 July 2023 14:45 (15 minutes)

NGC1068 is a Seyfert II starburst galaxy emitting in a very broad range of frequencies, from radio up until
gamma-ray energies. Since the observed high-energy neutrinos and gamma-rays fluxes are different by at
least 2 orders of magnitude, it becomes necessary to account for a multi-component model to describe the
multimessenger emission by NGC1068. The neutrinos signal can be explained through hadronic processes in
the corona of the AGN and the gamma-rays observed by Fermi-LAT can originate from the circumnuclear
starburst ring.
In this presentation, the pc-to-kpc scale radio jet of NGC1068 is investigated in terms of its potential gamma-
ray contribution via hadronic or leptonic processes. Moreover, the radio data provided by VLBA and ALMA
observations at different distances from the central engine is taken into account. So, it can be clearly shown
that it is very unlikely that these gamma-rays can be explained by this radio jet.

Primary author: SALVATORE, Silvia

Presenter: SALVATORE, Silvia

Session Classification: Student Talks

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

Hunt for Intermediate Black Holes with Gravitational Waves and Neutrinos

Monday, 17 July 2023 14:00 (15 minutes)

Intermediate mass black holes (IMBHs) have been theorized as an intermediate state between stellar and supermassive black holes (SMBHs), but not observations have confirmed their existence yet. We propose a method to search for them using Tidal Distruption Events (TDEs). In particular we focus on the disruption of white dwarfs (WDs) by IMBHs, as they are expected to produce both gravitational waves (GWs) and high energy neutrinos. This is particularly, interesting because WDs cannot be disrupted by a SMBH. We present an introductory study on this method and future prospects.

Primary authors: GÁLVEZ UREÑA, Alberto (Ceico at the Institute of Physics of the Czech Academy of Sciences); KŮS, Pavel (CEICO, Institute of Physics of the Czech Academy of Sciences)

Presenters: GÁLVEZ UREÑA, Alberto (Ceico at the Institute of Physics of the Czech Academy of Sciences); KŮS, Pavel (CEICO, Institute of Physics of the Czech Academy of Sciences)

Session Classification: Student Talks

Contribution ID: **102** Type: **Oral**

Intrinsic Resolution Limits in Low-Energy Neutrino Event Reconstruction with IceCube

Monday, 17 July 2023 14:30 (15 minutes)

The IceCube Observatory is a cubic-kilometer neutrino telescope built into the deep glacial ice at the South Pole. Low energy extensions to the detector include the existing DeepCore subarray and the upcoming IceCube Upgrade. These focus on neutrino oscillation physics using atmospheric neutrinos and are characterized by a denser instrumentation. These elusive particles are indirectly detected by collecting Cherenkov photons emitted by secondary charged particles produced as a result of neutrino-nucleon interactions inside the detector. The reconstruction of event information, in particular direction and energy of an incoming neutrino, is a crucial ingredient to the oscillation analyses. The accuracy of reconstruction is therefore affected by statistical fluctuations in the particle shower development as well as by photon propagation and detection efficiencies of sensors. My current research is focussed towards identifying the theoretically achievable resolution in the absence of modeling inaccuracies and computational limitations. The study aims to analyze the factors that limit reconstruction performance, which include algorithmic deficiencies such as minimizer performance and the available information contained in the events.

Primary author: DUTTA, Kaustav (Universität Mainz)

Co-authors: Dr RONGEN, Martin (University of Erlangen-Nuremberg); Prof. BÖSER, Sebastian (Johannes Gutenberg University Mainz)

Presenter: DUTTA, Kaustav (Universität Mainz)

Session Classification: Student Talks

Contribution ID: **103** Type: **Oral**

Modeling neutrino emission from Active Galactic Nuclei

Tuesday, 18 July 2023 14:00 (15 minutes)

The IceCube Neutrino Observatory is a cubic kilometer detector located at the South Pole that detects high-energy neutrinos by the Cherenkov radiation produced by secondary particles when they interact in the ice. With a decade of data, the IceCube Collaboration has started to identify active galactic nuclei (AGN) as neutrino sources. These had been theorized to be potential sites to accelerate cosmic rays and produce neutrinos. The sources are gamma-ray obscured sources, confirming evidence that they should be based on the diffuse extragalactic neutrino flux. In this talk, we present simple dimensional arguments that cosmic neutrinos are produced in AGN within less than 100 Schwarzschild radii from their central black hole.

Primary author: Ms KHATEE ZATHUL, Arifa (University of Wisconsin-Madison)

Presenter: Ms KHATEE ZATHUL, Arifa (University of Wisconsin-Madison)

Session Classification: Student Talks

Contribution ID: **104** Type: **not specified**

Light dark matter around 100 GeV from the inert doublet model

Wednesday, 19 July 2023 14:15 (15 minutes)

We made global fits of the inert Higgs doublet model (IDM) in the light of collider and dark matter search limits and the requirement for a strongly first-order electroweak phase transition (EWPT). These show that there are still IDM parameter spaces compatible with the observational constraints considered. In particular, the data and theoretical requirements imposed favour the hypothesis for the existence of a scalar dark matter candidate around 100 GeV. This is mostly due to the pull towards lower masses by the EWPT constraint. The impact of electroweak precision measurements, the dark matter direct detection limits, and the condition for obtaining a strongly enough first-order EWPT, all have strong dependence, sometimes in opposing directions, on the mass splittings between the IDM scalars.

Primary authors: KALHOR, Leila (Shahid Beheshti University); Mr MOHAMMADIDOUST, Mohammad; Dr ABDUSSALAM, Shehu

Presenter: KALHOR, Leila (Shahid Beheshti University)

Session Classification: Student Talks

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

Neutrino Decay scenarios on the Cosmic Neutrino Background

Monday, 17 July 2023 14:45 (15 minutes)

In this work, we explore the consequences of neutrino decay facilitated by a neutral scalar on possible cosmic neutrino background (CνB) detection in the future, especially in the PTOLEMY experiment. We analyze the distortion of the expected event spectrum as a function of the singlet mass and Yukawa couplings, and we consider both a three-neutrino scenario and a scenario with an extra sterile neutrino.

Primary authors: KOPP, Joachim (CERN and JGU Mainz); FERREIRA LEITE, Leonardo (State University of Campinas (Unicamp) / CERN)

Presenter: FERREIRA LEITE, Leonardo (State University of Campinas (Unicamp) / CERN)

Session Classification: Student Talks

Contribution ID: **106** Type: **Oral**

Diffusive shock acceleration and multi-messenger radiation from wind bubbles

Tuesday, 18 July 2023 13:30 (30 minutes)

Primary author: PERETTI, Enrico (Niels Bohr Institute, University of Copenhagen)

Presenter: PERETTI, Enrico (Niels Bohr Institute, University of Copenhagen)

Session Classification: Topical Seminar