

Workshop on core-collapse supernova neutrino detection



Rapport sur les contributions

ID de Contribution: **1**

Type: **Non spécifié**

Introduction

mercredi 4 juillet 2018 10:00 (20 minutes)

Orateur: COLEIRO, Alexis (APC / Université Paris Diderot)

ID de Contribution: 2

Type: **Non spécifié**

SuperNova Early Warning System (SNEWS)

mercredi 4 juillet 2018 10:20 (40 minutes)

The Supernova Early Warning System (SNEWS) is a cooperative effort between the world's neutrino detection experiments to spread the news that a star in our galaxy has just experienced a core-collapse event and is about to become a Type II Supernova. This project exploits the ~hours time difference between neutrinos promptly escaping the nascent supernova and photons which originate when the shock wave breaks through the stellar photosphere, to give the world a chance to get ready to observe such an exciting event at the earliest possible time. A coincidence trigger between experiments is used to eliminate potential local false alarms, allowing a rapid, automated alert.

Orateur: HABIG, Alec (University of Minnesota Duluth)

ID de Contribution: 3

Type: **Non spécifié**

CCSN neutrino detection with Super-Kamiokande and Hyper-Kamiokande

mercredi 4 juillet 2018 11:00 (40 minutes)

Orateur: KOSHIO, Yusuke

ID de Contribution: 4

Type: **Non spécifié**

CCSN neutrino detection with IceCube

mercredi 4 juillet 2018 11:40 (40 minutes)

Orateur: BENZVI, Segev

ID de Contribution: 5

Type: **Non spécifié**

Towards detecting extra-galactic supernovae in the antarctic ice

mercredi 4 juillet 2018 14:40 (40 minutes)

While the detection of a neutrino burst from a galactic supernova would provide a plethora of information on the stellar collapse as well as the neutrino properties, the low rate of 1-2 CCSNe per century make this a tedious endeavor. Instead, a detector with an effective mass of 10 Mton at 10MeV would detect extra-galactic supernovae at a rate of 1-2 per year - albeit with a much lower number of neutrino interactions per burst. I will present a conceptual design for the Megaton Ice Cherenkov Array (MICA) —a dedicated setup in the antarctic to ice optimized to detect extra-galactic neutrino bursts. Alongside with first results highlighting the physics potential I will show first steps towards realization of the required sensor technology.

Orateur: BÖSER, Sebastian (Universität Bonn)

ID de Contribution: 6

Type: **Non spécifié**

CCSN neutrino detection with DUNE

mercredi 4 juillet 2018 15:20 (40 minutes)

The Deep Underground Neutrino Experiment (DUNE), a 40-kt liquid argon time projection chamber detector located deep underground at the 4850L of the Sanford Underground Research Facility (SURF) in South Dakota, will record the burst of neutrinos from the core collapse of a massive star in the Milky Way neighborhood. DUNE's liquid argon has unique sensitivity to the electron neutrino component of the burst. This talk will present the expected capabilities of DUNE for measurements of neutrinos in the few-tens-of-MeV range relevant for supernova detection, and the corresponding sensitivities to neutrino physics and supernova astrophysics. Recent progress and some outstanding issues will be highlighted.

Orateur: GIL-BOTELLA, Inés

ID de Contribution: 7

Type: **Non spécifié**

Prospects for CCSN neutrino detection with KM3NeT

mercredi 4 juillet 2018 16:30 (30 minutes)

Orateur: COLOMER-MOLLA, Marta

ID de Contribution: 8

Type: **Non spécifié**

Prospects for CCSN alert triggering with KM3NeT

jeudi 5 juillet 2018 10:00 (30 minutes)

Orateur: LINCETTO, Massimiliano (Aix Marseille Univ, CNRS/IN2P3, CPPM, Marseille, France)

ID de Contribution: 9

Type: **Non spécifié**

Triangulation method for locating a core-collapse supernova

jeudi 5 juillet 2018 10:30 (40 minutes)

Modern neutrino facilities will be able to detect a large number of neutrinos from the next Galactic supernova.

In this talk we will present the update of the triangulation method for locating a core-collapse supernova by employing the neutrino arrival time differences at various detectors. We will discuss detailed numerical fits which are necessary in order to determine the uncertainties of these time differences for the cases when the core collapses into a neutron star or a black hole. A global picture with the inclusion of all relevant present and near future neutrino detectors is presented.

Orateur: BRDAR, Vedran

ID de Contribution: **10**

Type: **Non spécifié**

Neutrinos from supernovae and in binary neutron star mergers

jeudi 5 juillet 2018 11:10 (40 minutes)

We discuss the recent progress in our understanding of flavor evolution in dense astrophysical environments, in particular core-collapse supernovae and binary neutron star mergers. We highlight what we might learn from a galactic supernova, the connection to r-process nucleosynthesis and to the recent kilonova observation.

Orateur: VOLPE, Cristina (APC)

ID de Contribution: 11

Type: **Non spécifié**

Physics of supernova neutrino oscillations

jeudi 5 juillet 2018 14:00 (40 minutes)

In this talk the status of both known and unknown neutrino oscillation parameters will be reviewed, with particular focus on the mass ordering and its discrimination with present experiments and future projects. In this context our current understanding of supernova neutrino flavor conversions is discussed, from ordinary flavor oscillations during the shock-wave propagation to collective flavor transitions induced by self-interactions.

Orateur: MARRONE, Antonio (Dipartimento di Fisica, Univ. di Bari & INFN Bari)

ID de Contribution: 12

Type: **Non spécifié**

Collective Neutrino Oscillations in Dense Neutrino Media

jeudi 5 juillet 2018 14:40 (40 minutes)

Neutrino evolution in dense neutrino media is a very nonlinear and rich phenomenon. Such a dense neutrino medium could be found in very extreme astrophysical sites such as core collapse supernovae and neutron star mergers. Studying collective neutrino oscillations in the aforementioned settings is very important since neutrinos could play a key role in their dynamics and nucleosynthesis. In this talk, I will discuss our current understanding of this topic which has tremendously changed in the past few years.

Orateur: ABBAR, Sajad

ID de Contribution: **13**

Type: **Non spécifié**

Discussions

jeudi 5 juillet 2018 15:20 (40 minutes)

ID de Contribution: 14

Type: **Non spécifié**

CCSN neutrino detection with Borexino

mercredi 4 juillet 2018 14:00 (40 minutes)

Orateur: BAGDASARIAN, Zara

ID de Contribution: 15

Type: **Non spécifié**

Welcome coffee

mercredi 4 juillet 2018 09:30 (30 minutes)

ID de Contribution: **16**

Type: **Non spécifié**

Coffee break

mercredi 4 juillet 2018 16:00 (30 minutes)

ID de Contribution: 17

Type: **Non spécifié**

Welcome coffee

jeudi 5 juillet 2018 09:30 (30 minutes)

ID de Contribution: **18**

Type: **Non spécifié**

Coffee break

jeudi 5 juillet 2018 16:00 (30 minutes)

ID de Contribution: **19**

Type: **Non spécifié**

Discussions

jeudi 5 juillet 2018 16:30 (1 heure)