

RES-NOVA: a mK calorimeter with archaeological Pb for SN neutrinos detection

Thursday, 30 May 2024 19:00 (20 minutes)

The RES-NOVA project will directly detect neutrinos from core-collapse supernovae (SN) via coherent elastic neutrino-nucleus scattering (CEvNS) using an array of archaeological lead (Pb) based low temperature calorimeters. To enhance the detection cross-section, archaeological kg-scale Pb based crystals will be used, to achieve the highest cross section for CEvNS with the unique ultra-high radiopurity of archaeological Pb needed for its detection. RES-NOVA will operate as a highly sensitive neutrino observatory with the unique feature of being equally sensitive to all neutrino flavors. The first phase of the RES-NOVA project is planning to operate a demonstrator detector with a total active volume of $(30 \text{ cm})^3$. It will be sensitive to SN bursts from the entire Milky Way Galaxy with $>3\sigma$ sensitivity, while running PbWO_4 detectors with 1 keV energy threshold. RES-NOVA will discriminate core-collapse SNe from black-holes forming collapses with no ambiguity even with such small volume detector. The main SN parameters can potentially be constrained with a precision of few % while looking at $\nu_{\mu/\tau}/\bar{\nu}_{\mu/\tau}$. We will present the performance of the first prototype detectors, and sensitivity projections for the full detector. In this contribution we will show that RES-NOVA has the potential to lay the foundations for a new generation of neutrino observatories, while relying on a very simple and modular experimental setup. The very first 1 kg-scale crystal was measured at Laboratori Nazionali del Gran Sasso

Collaboration

RESNOVA

Role of Submitter

I am the presenter

Primary authors: PUIU, Andrei (INFN - LNGS); Dr PUIU, Andrei (LNGS)

Presenter: PUIU, Andrei (INFN - LNGS)

Session Classification: Detector Techniques for Cosmology and Astroparticle Physics - Oral session

Track Classification: T1 - Detector Techniques for Cosmology and Astroparticle Physics