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

# 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 (CE$\nu$NS) 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 CE$\nu$NS 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 $(30\ \mathrm{cm})^3$. It will be sensitive to SN bursts from the entire Milky Way Galaxy with >3σ 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 $\nu_{\mu/\tau}/\overline{\nu}_{\mu/\tau}$. 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

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

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