

Potential of RES-NOVA as a Dark Matter observatory

Wednesday, 10 July 2024 17:10 (20 minutes)

The quest to understand dark matter (DM) continues to be a driving force in astrophysics and particle physics. This talk discusses the potential of the RES-NOVA project, envisioned for detecting astrophysical neutrinos via Coherent Elastic Neutrino-Nucleus Scattering (CE ν NS), to also serve as a DM observatory. Leveraging the array of cryogenic detectors made from archaeological Pb, known for its ultra-high radiopurity, RES-NOVA is uniquely positioned to detect both neutrino and DM interactions via nuclear recoils. The use of Pb significantly enhances the coherent elastic neutrino-nucleus scattering cross-section, making it an ideal candidate for astrophysical phenomena investigation. By extending the operational principles and sensitivity of CE ν NS-based detectors, RES-NOVA may also be capable of observing DM particles from our galactic halo. The theoretical implications for such dual-use in RES-NOVA, the detector design, sensitivity, and a preliminary background model aimed at identifying DM candidate signals, are described.

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Session Classification: Poster session

Track Classification: Poster session: Direct detection