Contribution ID: **277** Type: **Parallel Contributed Talk**

Gaseous detectors for Neutrino-nucleus coherent scattering at the ESS

Wednesday, 24 February 2021 18:10 (20 minutes)

The recent detection of the coherent elastic neutrino-nucleus scattering (CEνNS)opens the possibil- ity to use neutrinos to explore physics beyond standard model with small size detectors. However, the CEνNS process generates signals at the few keV level, requiring of very sensitive detecting technologies for its detection.
The European Spallation Source (ESS) has been identified as an optimal source of low energy neutrinos offering an opportunity for a definitive exploration of all phenomenological applications of CEνNS. In this project I propose apply the high pressure xenon gas TPC technology to the detection of the CEνNS process at the ESS. This will require the development of very low-energy detectors and to improve the current knowledge of the quenching factor for nuclear recoils in xenon gas at keV energies. The major goal of this project is to build a 20 kg xenon gaseous detector and operate it at the ESS, such detector will provide more than 7,000 CEνNS events per year, overtaking the sensitivities of much larger detectors in current spallations sources.
In this talk I'll present the advantages of the gaseous TPC technology to exploit the physics of the CEνNS process and the experimental program towards the construction and operation of a gaseous detector at the ESS.

Collaboration name

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Session Classification: Data Science and Detector R&D

Track Classification: Neutrino Masses and Mixings