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Exploring CEvNS with NUCLEUS experiment & latest updates on the Cryogenic Outer Veto (COV)

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Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) is a weak neutral current process where the neutrino interacts with the nucleus as a whole. The CEvNS cross section is several orders of magnitude larger than that of other low-energy neutrino interactions, even though the single outcome of this process is a very small nuclear recoil.

The NUCLEUS experiment employs cryogenic calorimeters featuring gram-scale CaWO_4 and Al_2O_3 detectors with transition-edge sensors; these detectors have demonstrated exceptional energy resolution, detecting nuclear recoils as low as 20 eV, about two orders of magnitude smaller than those detectable by competitor experiments.

The aim of NUCLEUS is to achieve high-precision CEvNS measurements using neutrinos from the Chooz nuclear power plant.

However, the background level at the experimental site, called “Very Near Site”, must be kept under control through a complex system of active and passive shielding.

In this talk an overview of the NUCLEUS experiment and an update on the latest developments of the Cryogenic Inner Veto (COV) will be given.

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