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## Coherent Elastic Neutrino-Nucleus Scattering: An outlook on the mechanism, success and applications of the phenomenon.

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Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) is a phenomenon in which a neutrino and nucleus collide elastically in a coherent manner. This process involves low-energy neutrinos (having energy between 10keV and a few MeV) and surpasses any other neutrino-coupling scattering cross section by a wide margin, but observing the results has always been challenging due to the tiny recoil energy of the target nucleus. This is why, despite the fact that D. Freedman predicted this phenomenon in 1973, it was not actually observed until 2017 at Oak Ridge National Laboratory(U.S.A.) by the COHERENT collaboration. In this review article, we will explore the mechanism underlying this process, its compatibility with the Standard Model, and the characteristics that make it challenging to observe experimentally. Then, we will review the various methods used by experiments such as COHERENT, CONNIE, and CONUS to successfully observe the scattering results. We will conclude with a discussion of the applications of these experiments, such as portable neutrino detectors, measuring nuclear sizes, and how these results can also aid in the search for sterile neutrinos, leading to their use in probing dark matter.

### Session

Neutrino Physics

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