Search for Coherent Elastic Scattering of Solar B8 Neutrinos in the XENONnT

Solar neutrinos can interact with liquid xenon (LXe) dark matter detectors through coherent elastic neutrino-nucleus scattering (CEvNS), producing signals similar to DM-nucleus interactions. Known as the 'neutrino fog,' this phenomenon significantly challenges direct dark matter detection efforts. The XENONnT detector, noted for its substantial exposure and low background, provides a prime opportunity to probe this interaction. This presentation will detail the analysis of the first and second science runs of XENONnT to search for Solar B8 CEvNS signals.. We employed novel low-threshold analysis techniques, including suppression of the dominant accidental coincidence backgrounds and modeling of the multidimensional signal and backgrounds in statistical inference, to significantly enhance the sensitivity to solar B8 neutrinos.

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