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The RED-100 experiment (remote)

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Coherent elastic neutrino nucleus scattering (CEvNS) off atomic nuclei, predicted over 45 years ago, was recently observed in 2017 within the COHERENT experiment. With its cross section depending quadratically on the number of neutrons in nuclei, CEvNS surpasses all other known neutrino interaction cross sections for heavy elements. This unique characteristic makes it ideal for monitoring reactors using compact neutrino detectors.

This talk focuses on RED-100, a two-phase LXe neutrino detector designed to detect and study CEvNS in close proximity to the reactor core. Deployed at the Kalinin nuclear power plant in 2021, RED-100 successfully collected data during both reactor-off and reactor-on periods. However, the region of interest (ROI) is plagued by a significant background of coincidental single electrons caused by high energy depositions in the LXe bulk. This background cannot be eliminated by conventional cuts, necessitating the development of specialized machine learning and deep learning approaches for mitigation.

In this talk an overview of the experiment is provided, sources of background are discussed, with a particular emphasis on the primary background in the ROI. Furthermore, the presentation outlines plans for the future upgrade of the detector to enhance its performance.

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