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The Ricochet Reactor CEvNS Experiment: First Light and Experiment Progress

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RICOCHET is a coherent elastic neutrino-nucleus scattering (CE ν NS) experiment situated 8.8 m from the core of the 58 MW research reactor at the Institut Laue-Langevin (ILL) in Grenoble, France. Using arrays of individually instrumented cryogenic bolometers, the experiment aims to measure the sub-keV_{nr} cross section of CE ν NS with low-energy recoils from reactor antineutrinos. RICOCHET would be among the first to observe this process from a reactor source and, beyond this, will provide a probe into low-energy neutrino processes. The primary RICOCHET payload (known as the CryoCube) consists of 18 42 g cryogenic germanium bolometers instrumented with ionization and NTD-based phonon readout. A second payload using superconducting TES-based detectors (Q-Array) is also in R&D, and will be implemented within the RICOCHET cryostat in future runs. In early 2024, RICOCHET completed its installation and commissioning phase at ILL, and has since completed three experimental runs: the first two as dual-bolometer runs, and a third run in early 2025 with 9 bolometers. The focus of these runs was on detector optimization, as well as the integration of inner shielding, electronics, and a muon veto system. The fourth experimental run is the first with the 18-detector CryoCube payload, reaching toward kg-scale detector volume. This talk outlines the performance results of the first experimental runs, the current status of the experiment, and a look toward reactor CE ν NS detection.

Keyword-1

neutrino physics

Keyword-2

germanium detectors

Keyword-3

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