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Progress on Superconducting Bolometers for the RICOCHET Experiment

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The RICOCHET experiment located at the research reactor at ILL in Grenoble, France is a Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) observatory that aims to detect reactor neutrinos through low-energy nuclear recoils. RICOCHET has been commissioned and operated at ILL since the first half of 2024 with a small array of Ge detectors with heat and charge readouts. We focus on the development of the complementary detector array (Q-Array) under active R&D, which uses superconducting crystals (Zn, Al, and Sn) of around ~50 grams as the recoil target and Manganese-doped Al Transition-Edge-Sensors (TESes) for bolometric readout. We present and discuss the detector data and a corresponding cascade model for particle interactions in bulk superconductors. The cascade model provides physical insights towards understanding the data and achieving Particle identification (PID) for nuclear and electron recoil events in a bulk superconductor.

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