

Multi-Channel processing of solid-state cryogenic detectors for CEvNS precision measurement using the MPS Python library

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In precision CEvNS experiments like RICOCHET at Laue Langevin Institute reactor, the recoil energy is encoded in the amplitudes of pulses. In such experiments, detectors like the CRYOCUBE use multi-channel cryogenic solid-state detectors which is a promising technology to achieve low threshold gamma/neutron discrimination by measuring the ionization yield against heat energy. The CEvNS detection sensitivity and ultimate performances can only be achieved using performant and characterized signal processing techniques that allows for automated pulses detection and fitting. The proposed algorithm developed for RICOCHET implements low-threshold pulses detection, correlated noise reduction and efficient baseline noise estimation to manage the high event rate environment that we observe during calibration and above ground operations.

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