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POS-46 - SuperCDMS SNOLAB Data Acquisition System

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The Super Cryogenic Dark Matter Search (SuperCDMS) will be one of the leading efforts to directly search for Weakly Interacting Massive Particles (WIMPs) at the low mass scale (below $10 \text{ GeV}/c^2$). The SuperCDMS SNOLAB data acquisition (DAQ) and trigger system will use the MIDAS (Maximum Integrated Data Acquisition System) program - a flexible, open source C++-based DAQ framework, with off-the-shelf computers and custom trigger electronics for the SNOLAB project. The DAQ will involve front-end and back-end computers which together retrieve data from the detectors through a three-level triggering process, as well as an additional cluster that performs environmental monitoring, data quality monitoring, and real-time data analysis. The design of the SuperCDMS SNOLAB DAQ is such that there is deadtime-free triggering with very low energy thresholds, and the ability to handle high event rates during calibration by allowing for two different modes of data-taking: normal (WIMP search) and calibration mode. The flexibility and customizability of the MIDAS framework allows for the SuperCDMS SNOLAB DAQ to incorporate a mix of iZIP and high voltage (HV) detectors simultaneously, and provides easy scalability. Thus the SuperCDMS SNOLAB DAQ is a unified system capable of use for small-scale test facility experiments, intermediate-sized experiments such as CUTE and NEXUS, as well as the large-scale SNOLAB project.

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