TRIUMF Advanced Rare Isotope Laboratory (ARIEL)

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Octopi: A Portable Versatile Gamma-ray Spectrometer

Studies to probe the internal structure and interactions of nuclei often require precise measurement of radiation emitted from nuclear reactions or decay. Any particular modern nuclear experiment requires unique experimental conditions, creating a demand for versatile radiation detection arrays that can meet a wide variety of experimental needs, with minimal adjustment of physical hardware. The Octopi system, designed and implemented at Simon Fraser University (SFU), provides a digital data acquisition system for up to eight Compton-suppressed high-purity germanium gamma-ray detectors and up to four auxiliary detector channels. Real-time event filtering by a user-controlled logic module enables raw signals from detector subsystems to be accepted or rejected based on user-selectable coincidence logic. All triggering parameters are also computer-controlled for versatility. A subsection of the system was recently deployed at TRIUMF to measure muon-induced fission probabilities of U-238. In the near term, the Octopi array will be used at SFU's Nuclear Science Laboratory for measuring meta-stable radioisotopes produced on a D-T neutron generator.

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