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The TRIUMF-ISAC beta-decay program and future possibilities for study of beta-delayed neutron emitters

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Modern radioactive-beam facilities are capable of producing intense sources that are ideal for beta-decay studies. At the TRIUMF-ISAC facility, we have a strong program of nuclear structure studies utilizing beta-decay and the 8pi spectrometer. Part of our program have examined systems close to stability, concentrating on very-high-statistics measurements, while another component of the program examines nuclei far from stability. With 20 Compton-suppressed HPGe detectors, an array of 20 plastic scintillators for beta-particle tagging, 5 Si(Li) detectors for conversion electrons, a fast-plastic scintillator and 10 BaF₂ or LaBr₃ detectors for lifetime measurements, a moving-tape collector, all coupled to a high-precision and high-throughput data acquisition system, the 8pi spectrometer is currently the world's most sensitive array dedicated to beta-decay studies. We are currently constructing the GRIFFIN array, based on 16 large-volume clover detectors, that will replace the 8pi spectrometer and improve the gamma-gamma coincidence efficiency by a factor of 300 at 1 MeV.

A new device is also currently being constructed, the DEuterated Scintillator Array for Neutron Tagging (DESCANT), that covers a 1pi sr solid angle and will be coupled to GRIFFIN. This will enable studies of beta-delayed neutron emitters to an unprecedented level of sensitivity. Combined with new capabilities at TRIUMF-ISAC for producing neutron-rich beams, with the current actinide targets on the proton beam line or the new ARIEL electron accelerator and a photo-fission source, a program studying beta-delayed neutron emitters envisioned. This presentation will focus on the present and future experimental capabilities for such studies.

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