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An In-Situ Movable Calibration Source for Cryogenic Particle Detectors

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It is important to understand how particle detector responses depend on the detailed location of an event in the detector volume. This can be particularly difficult to measure directly in cryogenic detectors because the cryostats in which they are operated generally restrict access. One solution is to develop in-situ calibration sources which can be moved without significant interruption to normal detector operation. This talk presents a prototype device capable of moving a radioactive calibration source to multiple positions near a cryogenic particle detector. It utilizes a modified commercial stepper motor and has been demonstrated by scanning a calibration source across multiple positions along the radius of a prototype dark matter detector. Construction, heat load, and operation of the device are discussed, as is the effect of the motor on the particle detector operation. Finally, this talk presents analysis of the position sensitivity datasets obtained with this new technique.

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