Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Cosmogenic Activation of Dark Matter Silicon Detectors RYAN THOMAS, University of Chicago — A major source of background in next-generation silicon based dark matter experiments (such as DAMIC-M, SENSEI, and SuperCDMS) is cosmogenic activation of the silicon detector material, especially generation of tritium. Tritium is relatively long lived (compared to the time scale of dark matter experiments), and decays through a low energy beta decay, creating a significant irreducible background for silicon-based searches of low mass WIMPs or other low energy dark matter candidates. Despite this, the sea-level cosmogenic activation rate of tritium in silicon has been poorly understood, due to the relatively low saturation rate and low energy nature of the decay, which makes measuring the tritium naturally produced through cosmogenic processes extremely difficult. An alternative method is to expose silicon to a neutron beam that closely mimics the cosmic ray neutron spectrum, which produces a high enough rate to perform a direct counting measurement. We present the results of such an experiment using CCDs and wafers, and the resulting measurement of the cosmogenic activation rates for ^{3}H, ^{22}Na, and ^{7}Be in silicon.

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Date submitted: 08 Jan 2021 Electronic form version 1.4