

Abstract Submitted  
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**Development of Room Temperature Detectors for Neutron Tagging** CAITLIN CAMPBELL, WILLIAM BAKER, Texas A&M University, DR. RUPAK MAHAPATRA TEAM — The Cryogenic Dark Matter Search (CDMS) uses silicon and germanium detectors in the search for Weakly Interacting Massive Particles (WIMP), a candidate for dark matter. Although these detectors are heavily protected with lead and polyethylene, high energy neutrons may penetrate through the shielding and cause nuclear recoils on the detector that may be mistaken for a WIMP. The purpose of this project was to create a detector that shields as well as tags incoming neutrons to measure the background neutron noise. In the design a polyethylene cylinder slows fast neutrons to thermal that are captured by either a gadolinium or boron source, both of which have high thermal neutron cross sections. Boron neutron capture has decay products of gammas and alphas while gadolinium releases only gammas. A plastic scintillator converts the resulting gammas into visible light to be readout by an avalanche photodiode. Each signal read out by the electronic circuit corresponds to gammas released from a neutron capture. Because outside gammas and gammas decay products are indistinguishable in this project, detection of neutrons will not be absolute until the system is tested inside a lead casing in which outside gammas will be shielded.

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