

Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Plasma Time in Discriminating Nuclear Recoils in Germanium Detector for Dark Matter Searches¹ DONGMING MEI, D'ANN BARKER, University of South Dakota — In the detection of WIMP-induced nuclear recoils with high-purity germanium detectors, CDMS-type bolometers are often used in measuring the ionization yield. For this technology, the detector is operated in the milli-Kelvin temperature range, which requires high priced detectors. Alternative electron/nuclear recoil discrimination using pulse shape has been widely utilized in the energy range of MeV in neutrinoless double-beta decay experiments with germanium detectors. However, the nuclear recoils induced by WIMPs are in the energy range of keV, and their pulse shape difference with electronic recoils in the same energy range has not proven to be visible in a commercially available germanium detector. This paper presents a new idea of using plasma time difference in pulse shape to discriminate nuclear recoils from electronic recoils. We show the plasma time difference as a function of nuclear recoil energy. The technique using plasma time will be discussed with a generic germanium detector.

¹DOE DE-FG02-10ER46709, NSF PHYS-0919278, NSF PHYS-0758120, and the state of South Dakota

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Date submitted: 02 Jul 2012

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