

Abstract Submitted
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Demonstrating a directional detector based on neon for characterizing high energy neutrons ALLIE HEXLEY, Massachusetts Institute of Technology — MITPC is a gas-based time projection chamber used for detecting fast, MeV-scale neutrons. The standard version of the detector relies on a mixture of 600 torr gas composed of 87.5% helium-4 and 12.5% tetrafluoromethane for precisely measuring the energy and direction of neutron-induced nuclear recoils. I describe studies performed with a prototype detector investigating the use of neon, as a replacement for helium-4, in the gas mixture. My discussion focuses on the advantages of neon as the fast neutron target for high energy neutron events (100 MeV) and a demonstration that the mixture will be effective for this event class. I show that the achievable gain and transverse diffusion of drifting electrons in the neon mixture are acceptable and that the detector uptime lost due to voltage breakdowns in the amplification plane is negligible, compared to 20% with the helium-4 mixture.

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