

Scintillation Response Linearity of Nuclear Recoils in High Pressure Helium Gas

Saturday, 1 December 2018 11:00 (15 minutes)

We present an ongoing analysis of an experiment measuring the scintillation response linearity of high pressure helium-4 gas to nuclear recoils using a commercial fast neutron detector. The Arktis Fast Neutron Detector S670 is a tube filled with high pressure natural helium gas and several silicon photomultiplier (SiPM) light detectors, which collect scintillation light produced by particle interactions in the detector. We use a monoenergetic source of 2.8 MeV neutrons from a DD generator and an organic scintillator detector to tag neutrons scattering into a particular recoil angle and therefore fix the energy deposited into the helium gas. We analyze the linearity of the scintillation response of the detector down to a recoil energy of 83 keV by comparing the experimental data to Monte Carlo simulations of the experimental setup. We also present some of the advantages and pitfalls of using a commercial detector for such a measurement.

Session

Works in Progress (15+5 min)

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Session Classification: Works in Progress