

Neutron Beam Solid Transmission Monte Carlo Simulations

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NEWS-G's dark matter detectors use spherical proportional counters (SPC) filled with light gases to detect low energy WIMPs through nuclear recoil. The quenching factor for each gas used is calibrated for WIMP detection. This can be done using low energy neutrons which interact via nuclear recoil in a similar way to the predicted WIMP interaction. An experiment using a neutron beam in the 10keV region at Reactor Materials Testing Laboratory at Queen's University will be used to perform the calibration. We have conducted Monte Carlo simulations to measure how the neutron beam interacts in various materials to determine their output particles. The simulations allow us to determine the shielding required to remove the gamma background and the expected signal to noise ratio in the SPC.

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