

Table top neutron scattering experiment

The scattering of neutrons was observed in a table top experiment with an AmBe source. It is a crucial step towards quenching factor measurement in gases with a neutron beam for the NEWS-G experiment. Before conducting the upcoming in-beam experiments, it is important to do a systematic investigation to study the effects of different gas mixtures, pressures, sphere sizes, and ionization voltages. It is also very important to establish the DAQ and analysis-related tools in the lab. The current work make use of one of the diagnostic for doing various studies. It is to plot the drift time vs rise time of electrons generated due to the scattering of neutrons in the gas, which has a unique correlation. This correlation is independent of the energy of the neutrons, therefore the current work was done in the lab using a neutron source. The diffusion and drift are related and dependent on the gas. Various factors affecting the drift and diffusion were explicitly studied in this work. A good agreement was observed with the MagBoltz simulations.

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