

CAP Congress 2015 Abstract

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The n3He experiment aims to measure the parity violating asymmetry in the direction of proton emission from the capture polarized cold neutrons in an unpolarized gaseous ^3He target from the reaction $\vec{n} + ^3\text{He} \rightarrow T + p$. The size of the asymmetry is estimated to be $(-9.5 \rightarrow 2.5) \times 10^{-8}$, and our goal measurement accuracy is 2×10^{-8} . The asymmetry is a result of the low energy weak interaction between quarks and its measurement will provide a benchmark for modern effective field theory calculations.

The experiment uses a ^3He multiwire ionization chamber as the combined target and detector operated in current mode. Simulation is required study the ideal behavior of the chamber and verify it works as expected. To simulate the charge collection in the chamber Garfield++ is used to simulate the electron avalanches and ion mobility in the wire chamber fields. 3D field maps are generated using Gmsh and Elmer. Garfield++ does not simulate low energy particles ionizing gas so it is paired with a Geant4 simulation for charge deposition in the chamber. The experiment is currently running at the Oak Ridge National Lab (Tennessee, USA) and I will report on the simulation of, and initial data taken with the chamber.