

DNP Conference Abstract

A combined target and detector to measure parity violation in neutron capture on ^3He for the n3He Experiment

Mark McCrea
University of Manitoba

2015, October 28-31

The n3He Experiment aims to measure the parity violating asymmetry in the direction of proton emission relative to the initial neutron polarization direction in the reaction $\vec{n} + {}^3\text{He} \rightarrow T + p + 765\text{keV}$ to a high precision. The experiment is currently running at the Spallation Neutron Source. Due to the large neutron capture cross section on ^3He a multiwire ionization chamber operated in current mode is used as both target and detector. The target is filled with ^3He gas at 0.5 atm pressure and has a length of 33.8 cm. The frame stack consists of 16 signal wire planes and 17 HV planes with 144 signal wires. I will discuss the design, construction and assembly of the detector.

Multiple simulations are performed to understand the response of the detector to the neutron beam. I will discuss calculations using Garfield++ to simulate the electron avalanches and ion mobility in the wire chamber fields.