

Abstract Submitted
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Neutronics Studies for the Nab Experiment ELIZABETH SCOTT,
Univ of Tennessee, Knoxville, NAB COLLABORATION — The Nab experiment at the Spallation Neutron Source at ORNL aims to measure the neutron beta decay electron-neutrino correlation coefficient "a" and the Fierz interference term "b" with competitive precision. In Nab, the parameter "a" is extracted from the proton momentum and electron energy using an asymmetric magnetic spectrometer and two large-area highly pixelated Si detectors. To achieve 10^{-3} accuracy, there must be low background rates compared to our 1 kHz signal rates. The background is primarily reduced by using coincidence detection of the electron and photon from the decay. However, further reduction is still necessary. Neutron and gamma rates in the Si detectors can lead to false coincidences. The majority of this background radiation can be reduced by well designed collimation and shielding. The collimation design was done with McStas and the background shielding with MCNP6 (Monte Carlo N-Particle 6). Neutrons are absorbed by ${}^6\text{Li}$ -loaded materials or borated polyethylene and gammas close to spectrometer with non magnetic materials such as lead and stainless steel. I will present the shielding design and MCNP6 results.

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