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Precise beta decay studies in the UCNB and Nab Experiments
AARON SPROW, University of Kentucky, UCNB COLLABORATION, NAB COLLABORATION — Neutron decay correlations are sensitive to Standard Model parameters, and constrain Beyond the Standard Model physics competitive with high energy experiments like those conducted at the Large Hadron Collider. The UCNB and Nab experiments are two programs designed to study beta decay correlation coefficients. The goal of UCNB, at the Los Alamos Neutron Science Center (LANSCE), is to determine the neutrino asymmetry in polarized ultracold neutron decay, B, to a relative precision of $\delta B/B = 1 \times 10^{-3}$. The aims of Nab, at the Spallation Neutron Source (SNS) in Oak Ridge, are to determine the electron-neutrino correlation term, a, to a relative precision of $\delta a/a = 1 \times 10^{-3}$, and the Fierz interference term for neutron beta decay, b, to an uncertainty of $\delta b \leq 3 \times 10^{-3}$. A precise measurement of a will lead to a new precise determination of $\lambda \equiv g_A/g_V$, the ratio of axial to vector coupling constants, while measurements of b and B will set limits on BSM effects. Both experiments will utilize long magnetic spectrometers with highly segmented silicon detectors at each end to detect the coincident electron and proton from each decay event. A brief overview on the ongoing development work at LANSCE will be presented.

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