

Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Nab: toward a precise experimental characterization of neutron beta decay¹ DINKO POCANIC, Inst. of Nuclear and Particle Physics, University of Virginia, NAB COLLABORATION — Nab, a new program of measurements at the Spallation Neutron Source, Oak Ridge, TN, will study unpolarized neutron beta decays, with the goal to determine a , the electron–neutrino correlation with precision of $\delta a/a = 10^{-3}$, and b , the Fierz interference term, with uncertainty $\delta b \simeq 3 \times 10^{-3}$. Neutron beta decay offers a means to study the weak interaction with great precision; its relatively simple theoretical description in the Standard Model (SM) is overconstrained by the set of available observables. Projected Nab results will lead to a new precise determination of the ratio $\lambda = G_A/G_V$, and to significant reductions in the allowed limits for both right- and left-handed scalar and tensor currents. Alternatively, the experiment may detect a discrepancy from SM predictions consistent with certain realizations of supersymmetry. An optimized, asymmetric spectrometer has been designed to achieve the narrow proton momentum response function required to meet the physics goals of the experiment. The apparatus is to be used in a follow-up measurement (abBA) of observables A and B in polarized neutron decay. Nab is fully funded, and is in the construction stage. We discuss the experiment’s motivation, expected reach, and method.

¹Work supported by NSF grants PHY-0970013, 1126683, and others.

Dinko Pocanic
Institute of Nuclear and Particle Physics, University of Virginia

Date submitted: 01 Jul 2013

Electronic form version 1.4