Magnetometry and Systematic Effects in the Nab Experiment[1]

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NAB COLLABORATION — The Nab experiment will determine the electron-neutrino correlation parameter a with a precision of $\delta a/a = 10^{-3}$ and the Fierz interference term b to $\delta b = 3 \times 10^{-3}$ in unpolarized neutron β decay. These results are expected to lead to a new, precise, independent determination of the ratio $\lambda = G_A/G_V$ that will sensitively test CKM unitarity. A long asymmetric spectrometer is optimized to achieve fast proton momentum longitudinalization and the required narrow proton momentum response function. In the Nab spectrometer, a reliable relation of the measured proton TOF to a requires detailed knowledge of the effective proton pathlength, which in turn imposes further requirements on the precision of the magnetic fields in the Nab spectrometer. The Nab magnetometry goals, procedures, and associated systematics will be discussed.

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