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Commissioning of the St. Benedict Gas Catcher and RF Carpet

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The Standard Model is known to be incomplete. One such area where it falls short is evidenced by the most precise evaluation of the V_{ud} element of the CKM matrix, which currently yields a $\sim 2.4\sigma$ tension with unitarity. In an effort to further study this, the Superaligned Beta-Neutrino Decay Ion Coincidence Trap (St. Benedict), in construction at the University of Notre Dame Nuclear Science Laboratory (NSL), aims to precisely measure the beta-neutrino angular correlation parameter in superallowed mixed β decay transitions between mirror nuclei in order to improve the accuracy on the determination of V_{ud} . St. Benedict will consist of a gas catcher to stop the radioactive ion beams produced by the NSL's TwinSol RIB facility; a radio-frequency (RF) carpet and radio-frequency quadrupole (RFQ) ion guide to transport the ions through a differentially pumped region; an RFQ cooler and buncher to cool and bunch the beam; and a linear Paul trap where the measurement will take place. The off-line commissioning of the gas catcher and the RF carpet will be presented. This work is supported by the NSF under grant number PHY-1725711.

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