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Online Tests of the Advanced Cryogenic Gas Stopper at NSCL

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Linear gas stoppers filled with helium have become a common tool to convert high energy rare isotope beams into low-energy beams. The National Superconducting Cyclotron Laboratory (NSCL) has designed and fabricated a new cryogenic gas stopper to maximize efficiency and beam rate capability in order to increase scientific reach at the facility. Compared to earlier designs, the Advanced Cryogenic Gas Stopper (ACGS) is expected to have increased extraction efficiency, reduced transport time, reduced molecular contamination of the isotope of interest, and minimized space charge effects. A novel 4-phase Radio Frequency wire-carpet generates a traveling electrical wave for fast ion transport, cryogenic cooling of the helium gas chamber reduces unwanted molecular formation, and a new planar geometry with a bare wire-carpet in the mid-plane of the stopper alleviates space charge effects. Prototype testing of the ACGS components have shown wire-carpet transport efficiencies greater than 95% and transport speeds up to 100 m/s. First online tests of the ACGS with radioactive beams have been performed and the results will be presented.

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