

SMI-2023: 14th International Conference on Stopping and Manipulation of Ions and Related Topics



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Beam Stopping Facility at FRIB

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Stopping devices provide access to a wide range of exotic radioactive ion beams with precise and low-energies at projectile fragmentation facilities. The stopping process includes slowing down the fast exotic beams in solid degraders combined with momentum compression and removal of the remaining kinetic energy by collision with helium buffer gas. The beam stopping facility at the Facility for Rare Isotopes Beams (FRIB) includes two gas cells, namely the Room Temperature Gas Cell (RTGC) constructed by Argonne National Lab and the Advanced Cryogenic Gas Stopper (ACGS), connected two momentum compression high beam lines and low energy transport systems. The ACGS is design and built to increase extraction efficiency, reduce drift time, reduce molecular contamination, and minimize space charge effect with relative to RTGC. Some of ACGS design properties has been tested with several beams and showed significant improvements. The stopped beam facility provides exotic radioactive beams to low energy experimental stations and reaccelerated experiments. The various user demands lead continuous improvements on the stopping and extraction efficiencies, the drift time in gas cell and the chemical forms of the extracted beams. The molecular forms of extracted ions have been studied for a variety of chemical elements at the room and cryogenic temperatures. The recent developments in ACGS and the stopped beam facility, and new challenges with the Advance Rare Isotope Separator (ARIS) beams will be presented.

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