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Measuring the Properties of a Supersonic Gas Jet Target
MIA GRACE CANTRELL, University of Tennessee Knoxville, KELLY CHIPPS, MATTHEW HALL, Oak Ridge National Laboratory, KATE JONES, University of Tennessee Knoxville — Stellar explosions are the result of runaway nuclear reactions, but testing these reactions in the laboratory can be difficult. Supersonic gas jet targets can help us study some of these astronomical processes, because many of the nuclear reactions involve isotopes that only exist as gasses. The SOLenoid and Supersonic Target in Structure Experiments (SOLSTISE) experimental system at Oak Ridge National Laboratory has been made to test the implementation of a supersonic gas jet target inside a solenoidal spectrometer, like the Helical Orbit Spectrometer at Argonne National Laboratory. The design of a gas jet target system inside a solenoidal spectrometer is a difficult task, because shadowing of the reaction particles by the jet infrastructure must be minimized, and the vacuum pumps must be placed far away from the magnetic field. Tests are currently being conducted to minimize shadowing by testing different gas receiver cones, and measurements of the energy loss of alpha particles through the jet allow for the determination of jet density profiles for each cone. These preliminary jet density profiles and cone designs will be presented.

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