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Minimizing Residual Pressure within a Windowless Gas Target System - JENSA ORLANDO GOMEZ, Floirda International University, JUSTIN BROWNE, ANTONIOS KONTOS, FERNANDO MONTES, Michigan State University, JENSA COLLABORATION — Nuclear reactions between light gases and radioactive isotope beams are essential to address open questions in nuclear structure and astrophysics. Pure light gas targets are critical for the measurements of proton- and alpha-induced reactions. Jet Experiments in Nuclear Structure and Astrophysics (JENSA) is the world's most dense ($\sim 10^{19}$ atoms/cm^2) windowless gas target system. Most of the gas flow is localized; however, escaping gas creates a pressure gradient which degrades experimental measurements and contaminates the beam line. JENSA contains a differential pumping system to maintain a vacuum. The previous design configuration was not optimized for experiments (pressure measurements 70 cm downstream from the jet were $\sim 10^{-3}$ torr; optimal is less than 10^{-4} torr). We have altered the current differential pumping system to minimize the residual pressure profile. Several configurations of two gas-receiving catchers were tested, and the most efficient ones identified using Enhanced Pirani and Cold Cathode gauges. We have determined the 30 mm outer and 20 mm inner gas-receiving cones minimize JENSA central chamber pressure to 200 millitorr at 16,000 torr of discharge pressure. Altering the tubing configuration has additionally lowered the pressure 70 cm downstream to 10^{-5} torr. The new residual pressure allows operation of JENSA with planned expansion of a recoil mass separator SECAR.

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None

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