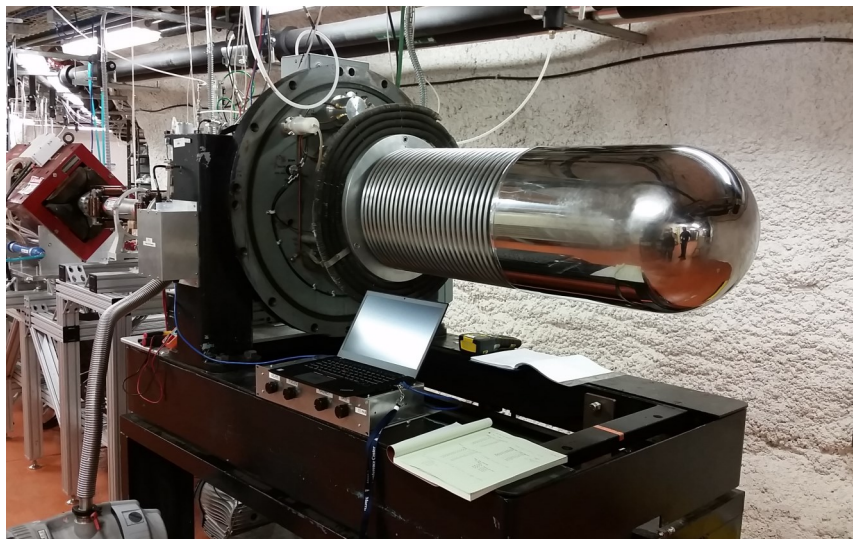


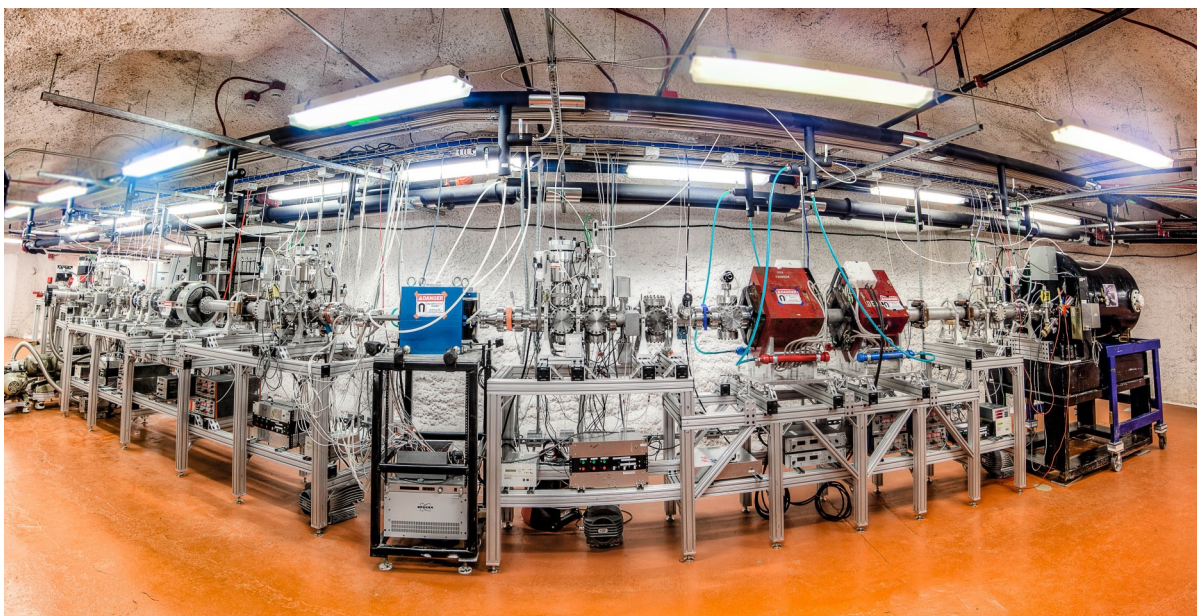
First CASPAR beam on the horizon

CASPAR the Compact Accelerator System for Performing Astrophysical Research is a low-energy nuclear astrophysics lab located underground at the 4850 ft level of the Sanford Underground Research Facility (SURF). The 1MV accelerator system saw its first stage of commissioning completed in early March, with the first ignition underground of the RF ion source, and H and He plasma creation. The accelerator system is a collaboration between the University of Notre Dame, the South Dakota School of Mines and Technology and Colorado School of Mines. In a push to see beam delivered to target during the summer of 2017, the CASPAR team has sealed the system, made ready the accelerator with the introduction of its insulating gas, and is prepped for first voltage and beam tests.



The CASPAR 1 MV JN accelerator. Shown here with the pressure vessel retracted for system testing. Visible are the high-voltage terminal shell and acceleration column.

A final safety review has recently been completed paving the way forward for initial ion beam delivery. System commissioning and characterization will shortly follow, making CASPAR one of only two underground nuclear astrophysics accelerator labs in the world, and the only one in the US. The bringing online of the CASPAR facility, adds a powerful new tool in the investigation of low-energy cross-section measurements of astrophysical interest. A main concentration of the facility will be the reactions important for the production of neutrons as seeds for the s-process, $^{13}\text{C}(\alpha, n)$ and $^{22}\text{Ne}(\alpha, n)$, pushing current measurements into the astrophysical burning window. This much needed data seeks to help constrain current astrophysical models.



The complete CASPAR system in the underground cavity. Beam transport is from the 1 MV accelerator at the right of the page, to the current gas target system at the left. (Picture provided by Matt Kapust)