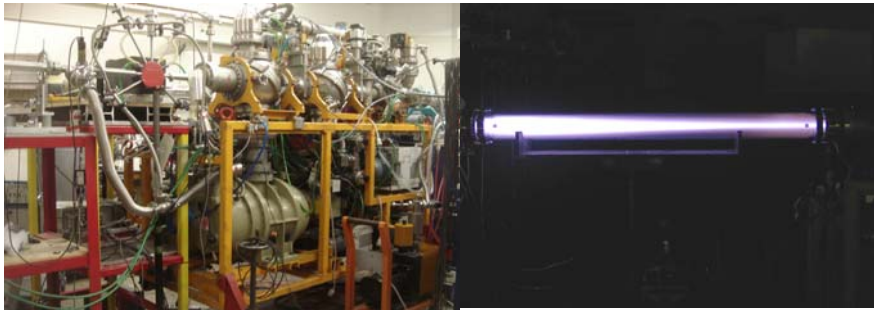


The Rhinoceros Gastarget at Notre Dame

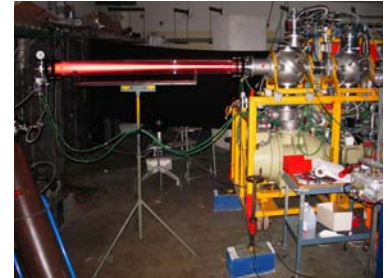


Recirculating windowless gas-target systems are important instruments for low energy measurements of relevance for nuclear astrophysics. The gas provides pure target material conditions, and the beam energy loss is minimized so that the measurements can be pursued towards very low energies. The Rhinoceros gas-target from the University of Stuttgart has been installed at the Notre Dame Nuclear Structure laboratory for measuring the low energy cross sections of alpha capture reactions in stellar helium burning.

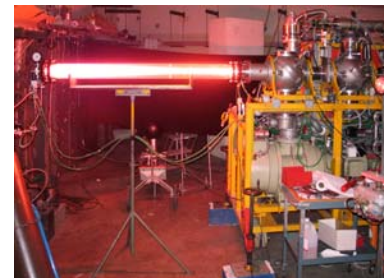
The gas-target has been tested with different gas loads to study the performance for different gas types at different beam energies and intensities. These tests have been successfully completed.

The gas-target is presently used for measuring critical reactions for neutron production in stellar helium burning such as $^{18}\text{O}(\alpha,\gamma)^{22}\text{Ne}$, $^{22}\text{Ne}(\alpha,\gamma)^{26}\text{Mg}$, and $^{22}\text{Ne}(\alpha,n)^{25}\text{Mg}$ taking advantage of the high alpha beam intensities provided by the low energy Notre Dame accelerators. In the future the gas-target will be used in connection with the St. George recoil separator at Notre Dame for low energy capture reaction studies in inverse kinematics.

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He beam in extended window-less Neon gas-target.



Intense He beam in extended window-less Neon gas-target.



He beam in extended window-less Nitrogen gas-target.

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