

Installation and characterization of the AGGIE gas-filled separator

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The gas-filled separator formerly known as SASSYER [1], which was previously installed at Yale University [2], has been installed on a beamline in Cave 4 at the Cyclotron Institute. As part of the recommissioning, it has been renamed Al Ghiorso's Gas-filled Ion Equipment (AGGIE). When commissioning is complete, it is expected to substantially increase the sensitivity of fusion-evaporation experiments, since the gas-filled separation technique [3] reduces the width of the magnetic rigidity distribution of the products, resulting in an increased transmission efficiency. The separator was previously reported to have separation factor of 10^{15} for full-energy projectiles [3].

Initial installation occurred in parallel with improvements to the NIMROD array and relocation of the Hyperion array during Fall 2018. The installation required a significant effort from the Operations Group, as the Cave 4 roof planks were temporarily removed, the main magnets were installed, and power and water cables were installed. A new target box was also fabricated. The corresponding beamline has been reassembled and a preliminary test has confirmed that beam delivery is possible. The downstream side of the separator is shown in Fig. 1(left).

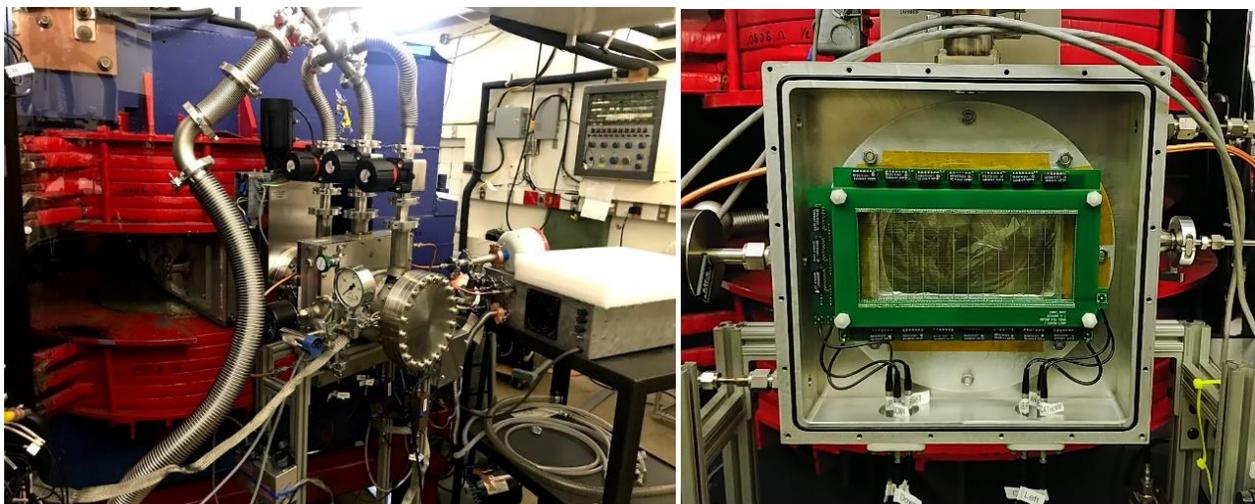


FIG. 1. Left: Downstream end of the gas-filled separator AGGIE installed on a beamline in Cave 4. MACY is installed inside the square box near the end of the beamline. Right: Interior view of MACY. The black boxes are delay-line resistors that create a time difference between the left/right and up/down signals.

Additional equipment received from Yale University included the Multiwire Avalanche Counter at Yale (MACY, a gas-filled position-sensitive implantation detector), a multiplexing set of electronics, a pair of double-sided silicon detectors (DSSDs), gas-handling equipment, and other ancillary equipment. During Spring 2019, MACY received extensive repairs, as it arrived with both of its Mylar® windows

and several of its wires broken. The detector was installed at the end of AGGIE [see Fig. 1(right)] and has been characterized with alpha and fission products sources using isobutane as a fill gas. The multiplexing electronics and DSSDs were tested during a previous reporting period and have been successfully interfaced to the existing data acquisition system. Commissioning experiments with the full setup are scheduled for Fall 2019.

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- [3] A. Ghiorso *et al.*, Nucl. Instrum. Methods Phys. Res. **A269**, 192 (1988). doi:10.1016/0168-9002(88)90877-7.