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Extended Proton Tracking Target for In-Beam Spectroscopy

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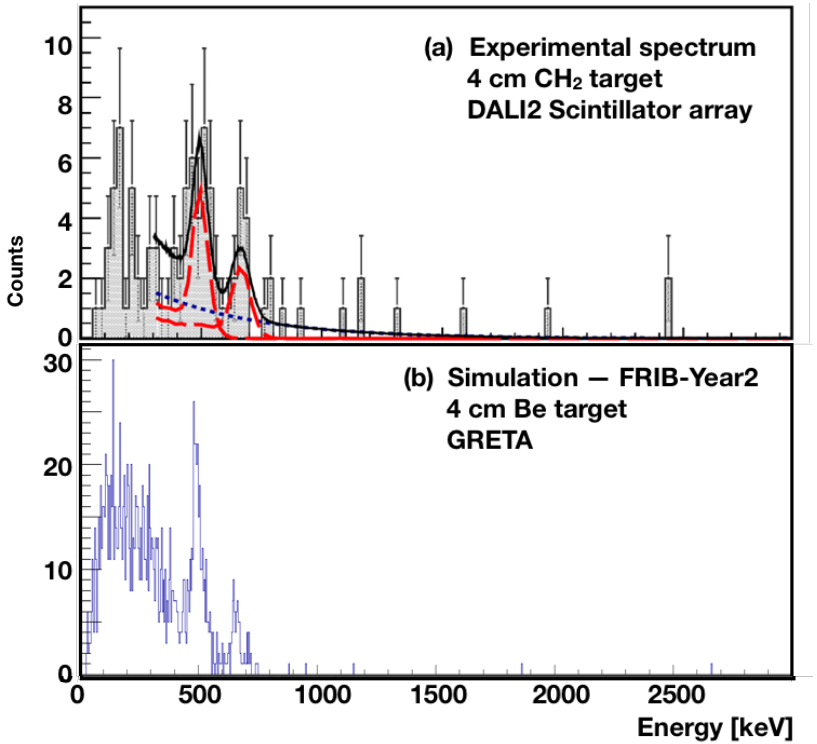
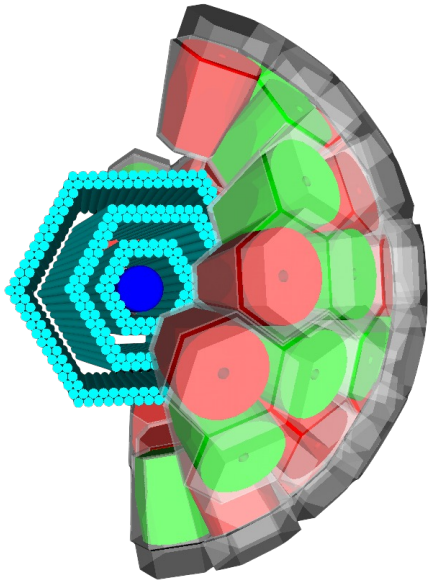
Revisiting ^{40}Mg Spectroscopy at FRIB

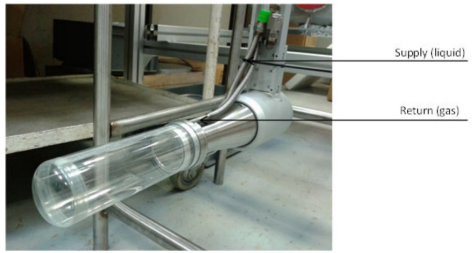


- In-beam gamma-ray spectroscopy toward the driplines is a challenge, even at FRIB
- To obtain the statistics necessary, one needs to optimize luminosity – beam x target thickness
- For an array such as GRETA, the benefits of HPGe are lost quickly with thick (~cm) targets
- Need another solution…

HLC *et al.*, Phys. Rev. Lett. **122**, 052501 (2019).

High Luminosity with GRETA at FRIB





- Take the MINOS LH_2 target (developed by A. Obertelli *et al.*) as inspiration
- An extended (10-15 cm) LH_2 cell will be surrounded by a compact configuration of straw-tube (small diameter gas counters) detectors for proton detection and vertex reconstruction
- Geometry is optimized for operation with GRETA, to maintain maximum gamma-ray detection efficiency
- DAQ will be developed to work easily with GRETA systems and planned HRS systems
- The combination of GRETA and the new ExPRT target will be **central to experiments on the most neutron-rich nuclei**

High Luminosity with GRETA at FRIB