

# HAPL target $^4\text{He}$ spectrum and armor threat

***Gregory Moses and Thad Heltemes***

University of Wisconsin-Madison

HAPL Workshop

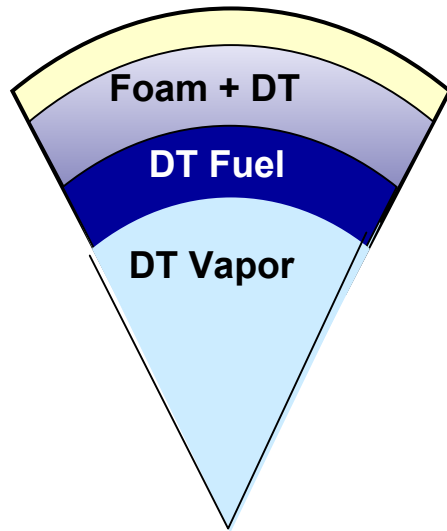
Princeton, NJ

December 12 and 13, 2006

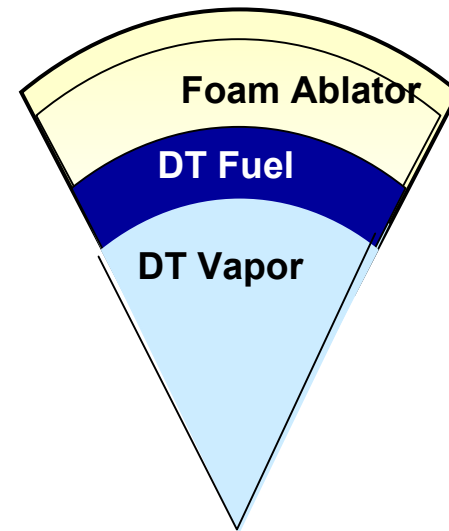
# Summary

- Alpha particle threat to armor includes
  - Thermal response resulting from deposition
  - Materials response resulting from deposition
- Require  $\rho r = 0.5 \text{ g/cm}^2$  of intervening material to protect armor from penetration by energetic alpha particles.
  - Gas protection is not viable for high energy alpha particles—20 torr pressure.
- Target re-design is a possible option.

# Target redesign to mitigate alpha threat to armor



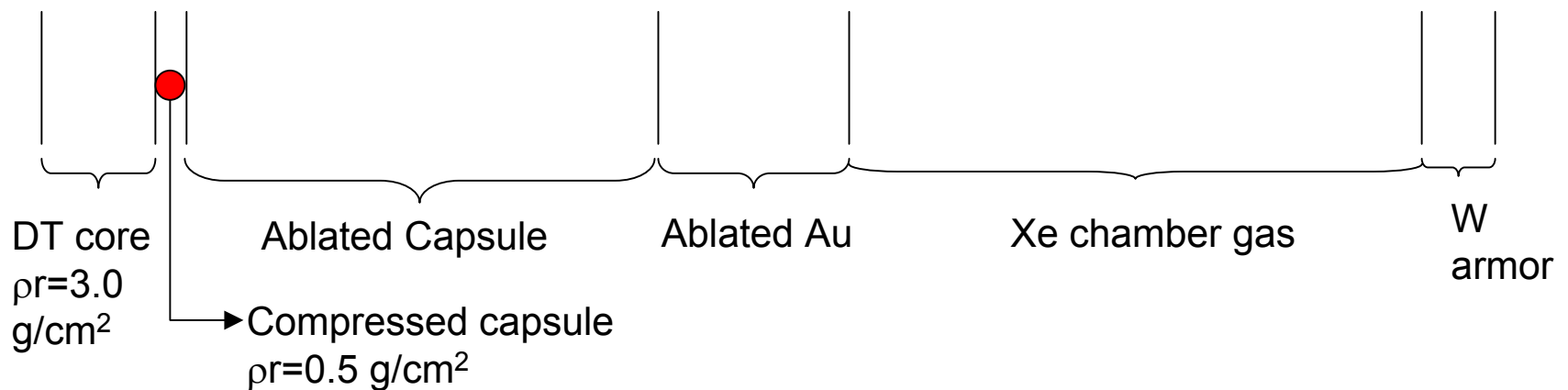
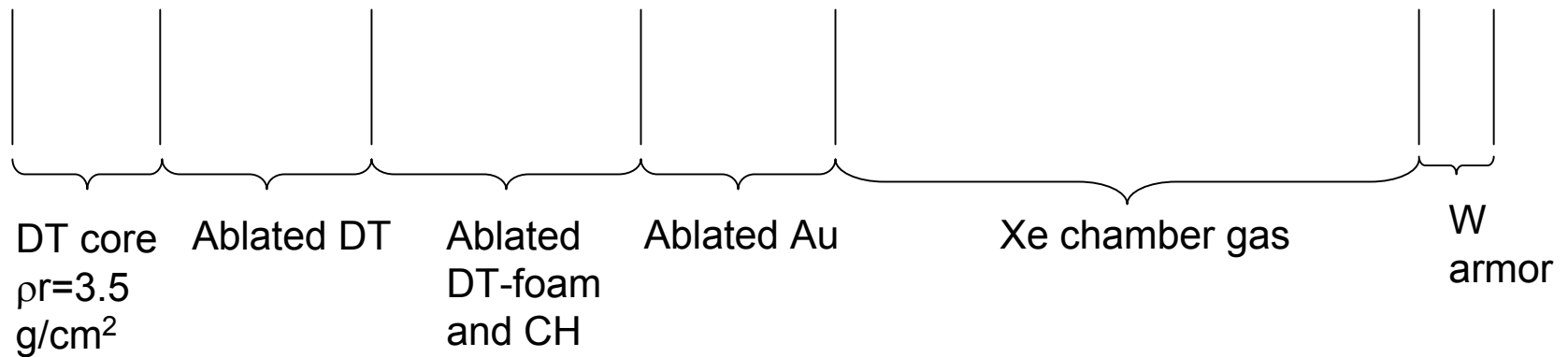
HAPL design has DT ablator



Alternate design has non-DT ablator

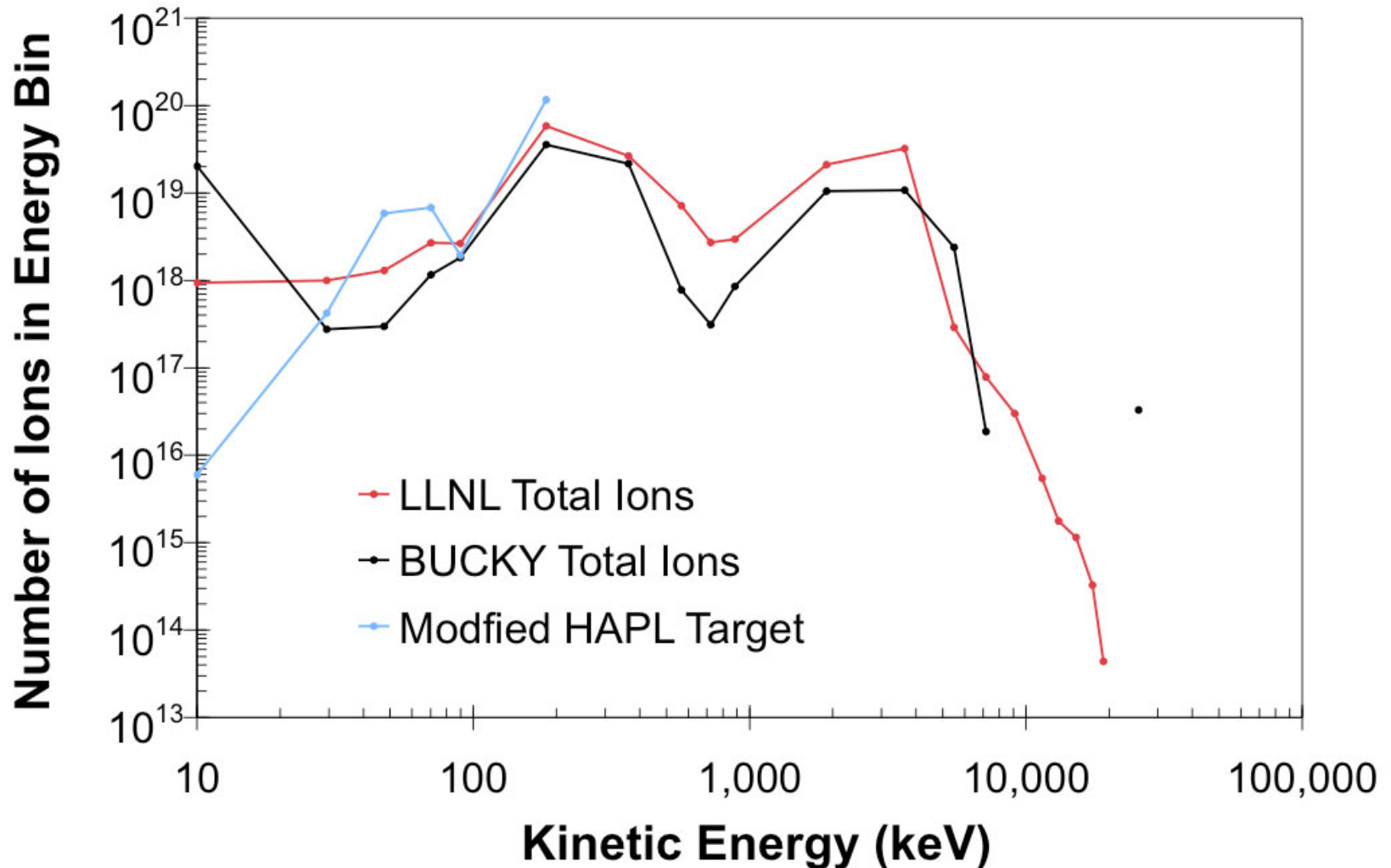
# DT ablator leads to energetic alpha spectrum at the armor

Radial build of HAPL target and chamber at ignition—NOT TO SCALE.



Radial build of alternate target and chamber at ignition—NOT TO SCALE.

# Alpha threat spectrum for alternate non-DT ablator target is softer



# LLNL alpha threat spectra at armor as function of Xe gas pressure

