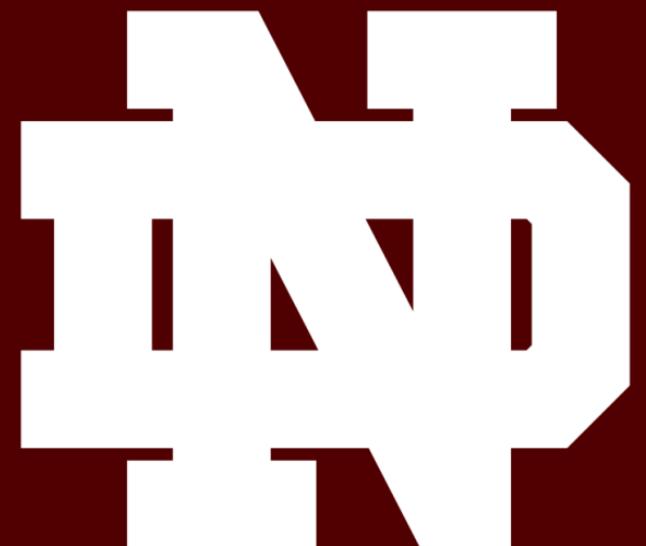


Calibrating DAPPER to measure Photon Strength Function of ^{58}Fe using (d,p γ) in Inverse Kinematics

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Introduction

Photon strength functions (PSF) are essential inputs for Hauser-Feshbach radiative neutron capture cross-section calculations

Enhancement in the low gamma-ray energy region has been observed in many isotopes – important for r-process reaction rates

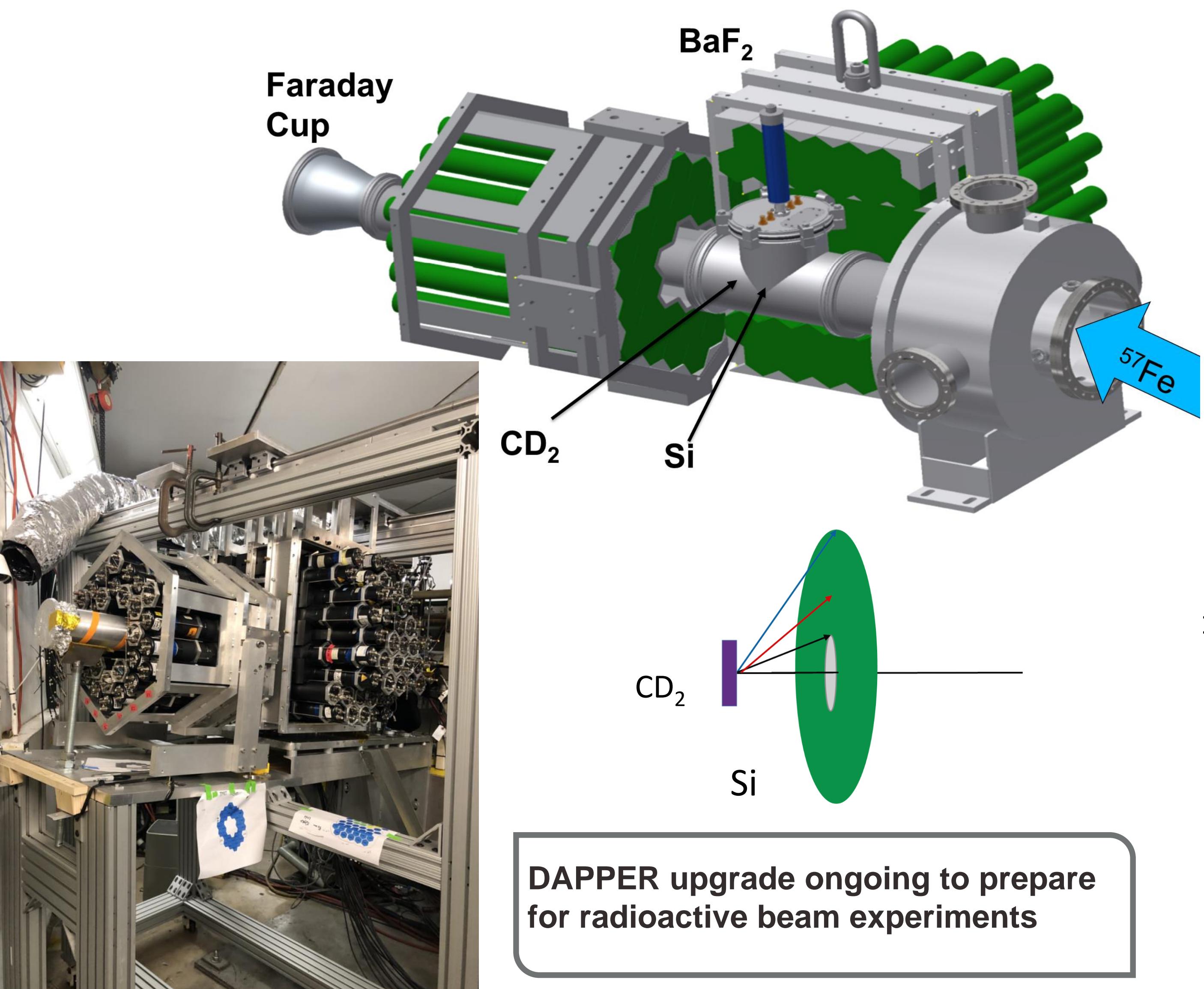
See if feature exists in PSF of ^{58}Fe , which would be consistent with observation in ^{56}Fe and ^{57}Fe

DAPPER

Detector Array for Photons, Protons, and Exotic Residues

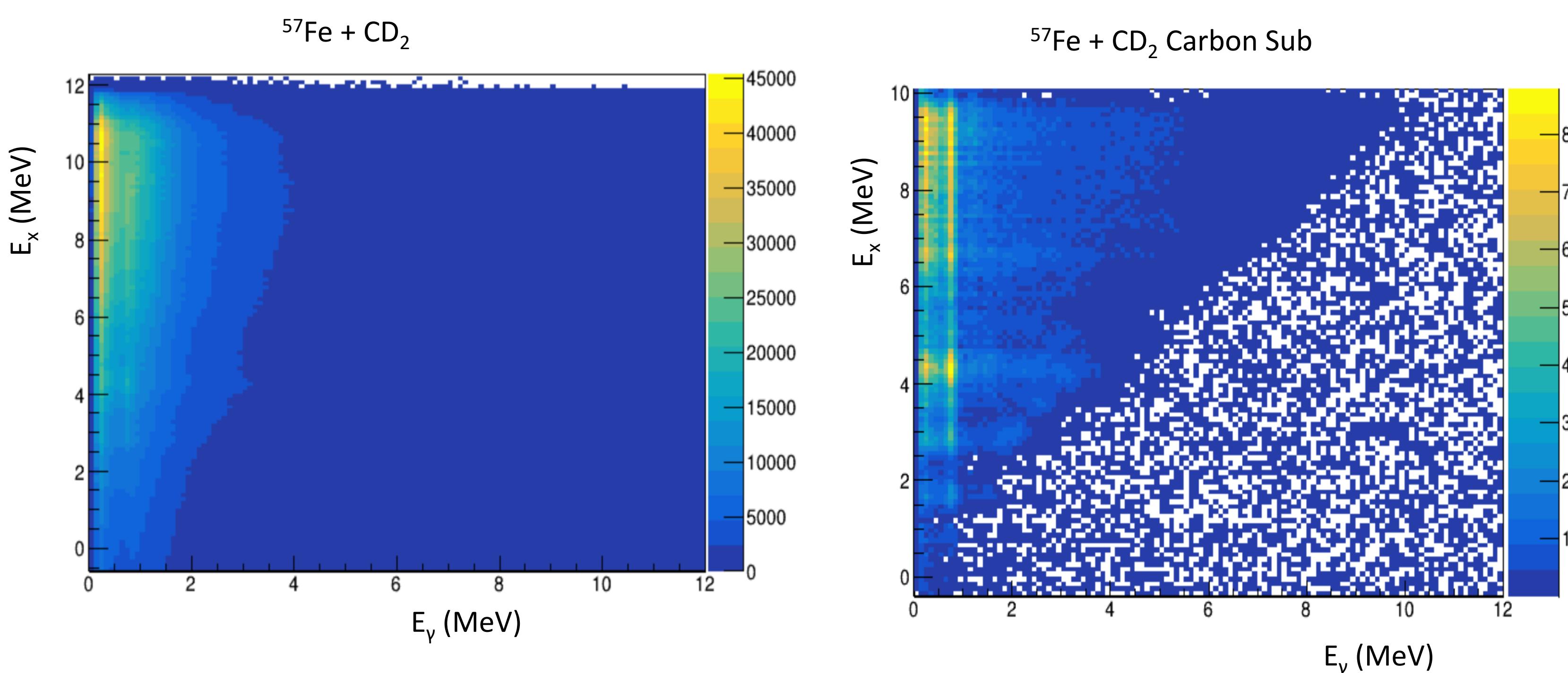
Built to measure PSF of nuclei using (d,p γ) reactions in inverse kinematics

500 μm S3 silicon detector, 128 BaF₂ scintillators, CD₂ targets and faraday cup



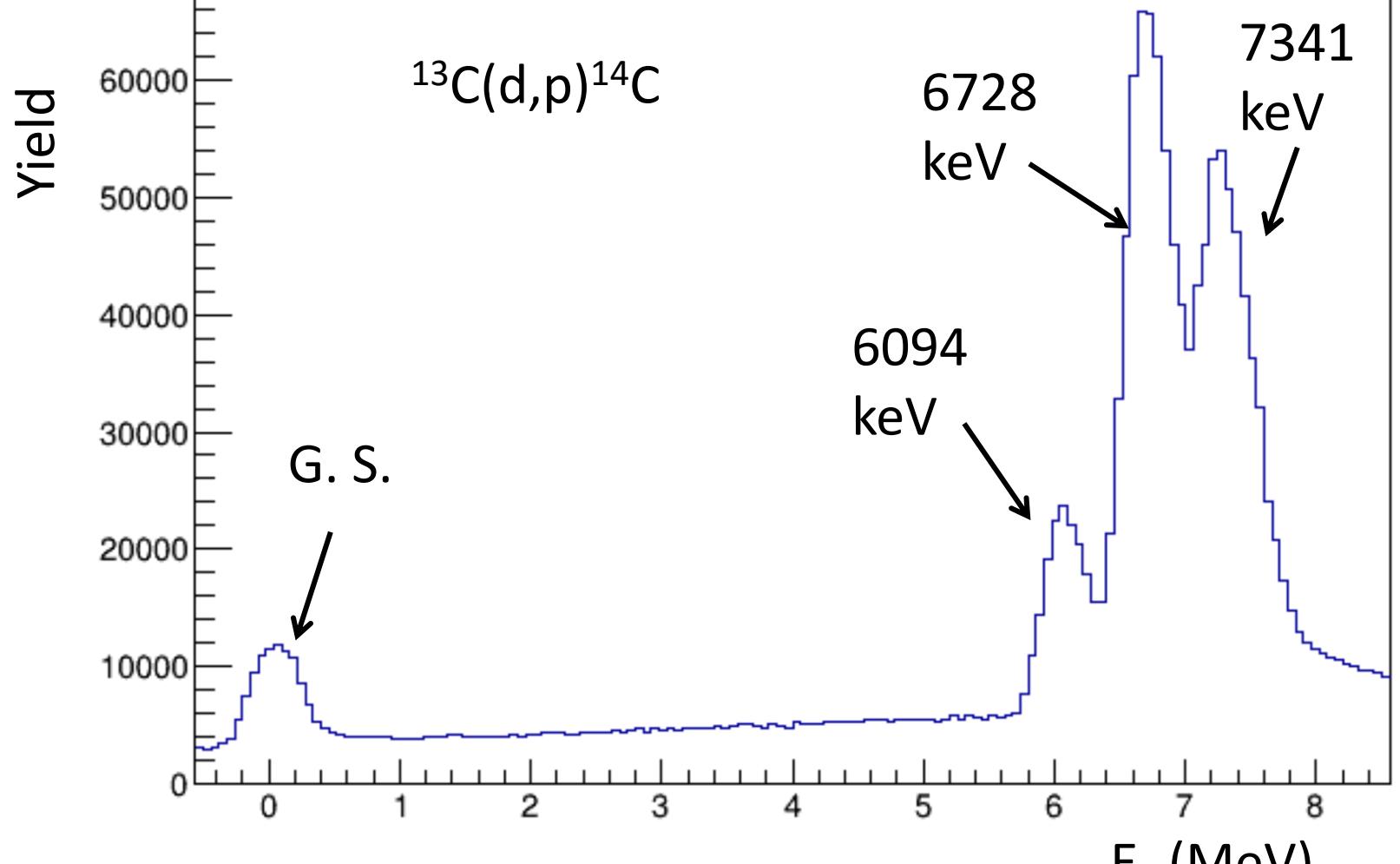
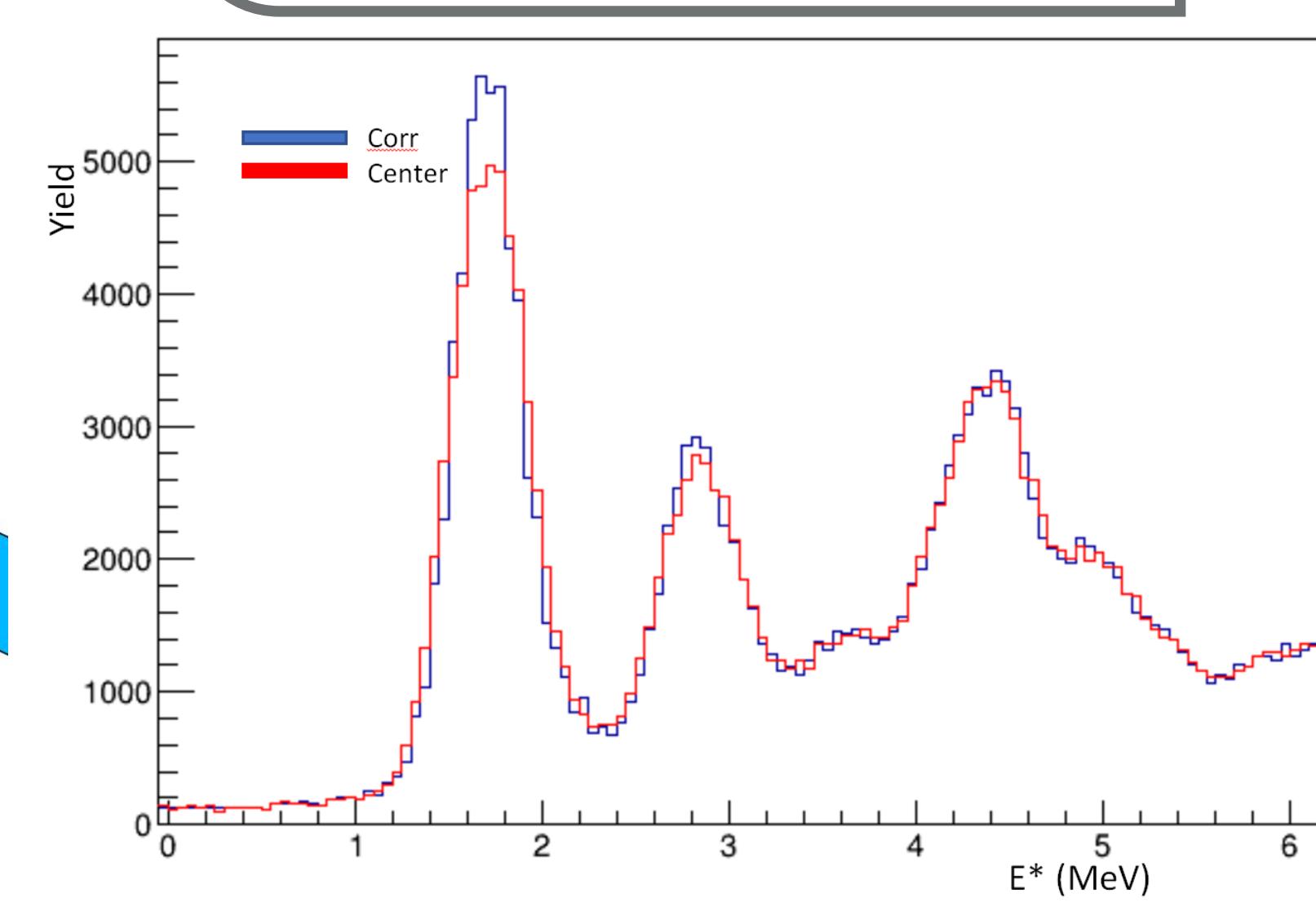
DAPPER upgrade ongoing to prepare for radioactive beam experiments

(E _{γ} , E_x) Matrix



Silicon Calibration

Using protons from ^{14}C to constrain low energy region
Corrections made for E* - target thickness and beam spot position

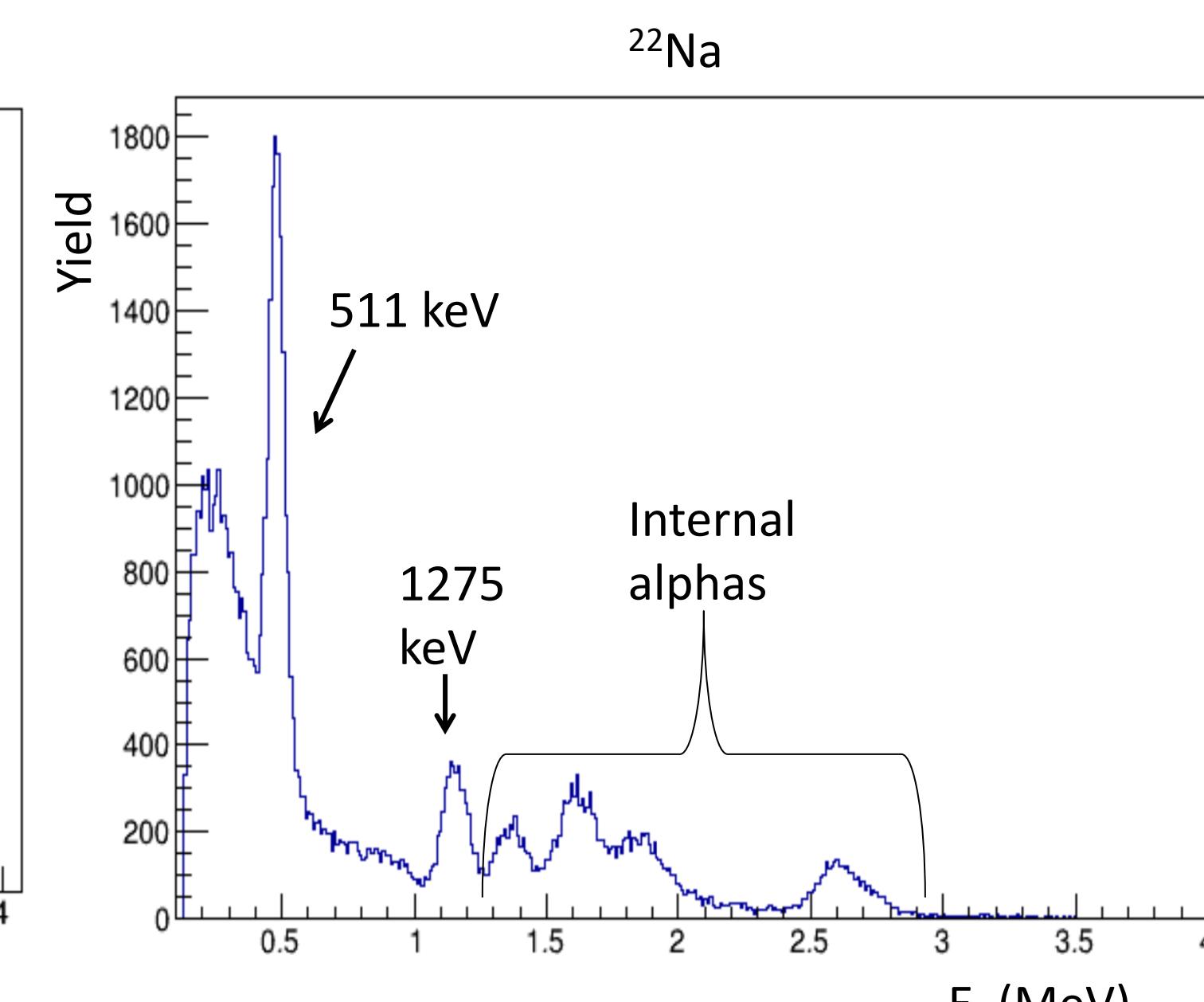
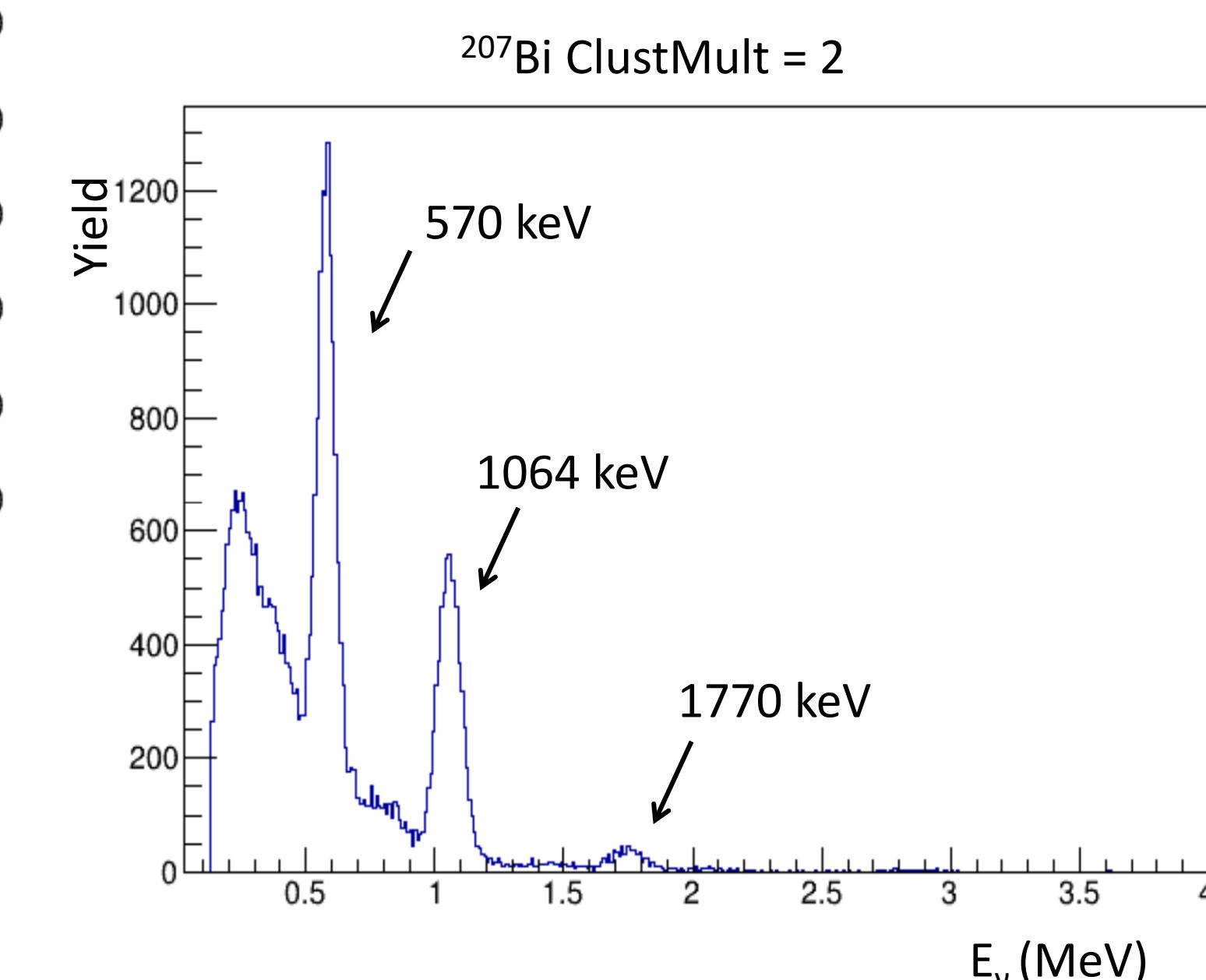


BaF₂ Calibration

Energy calibrated using various sources (^{22}Na , ^{60}Co , ^{137}Cs , ^{207}Bi , ^{232}U)

Gain calibrated using background runs

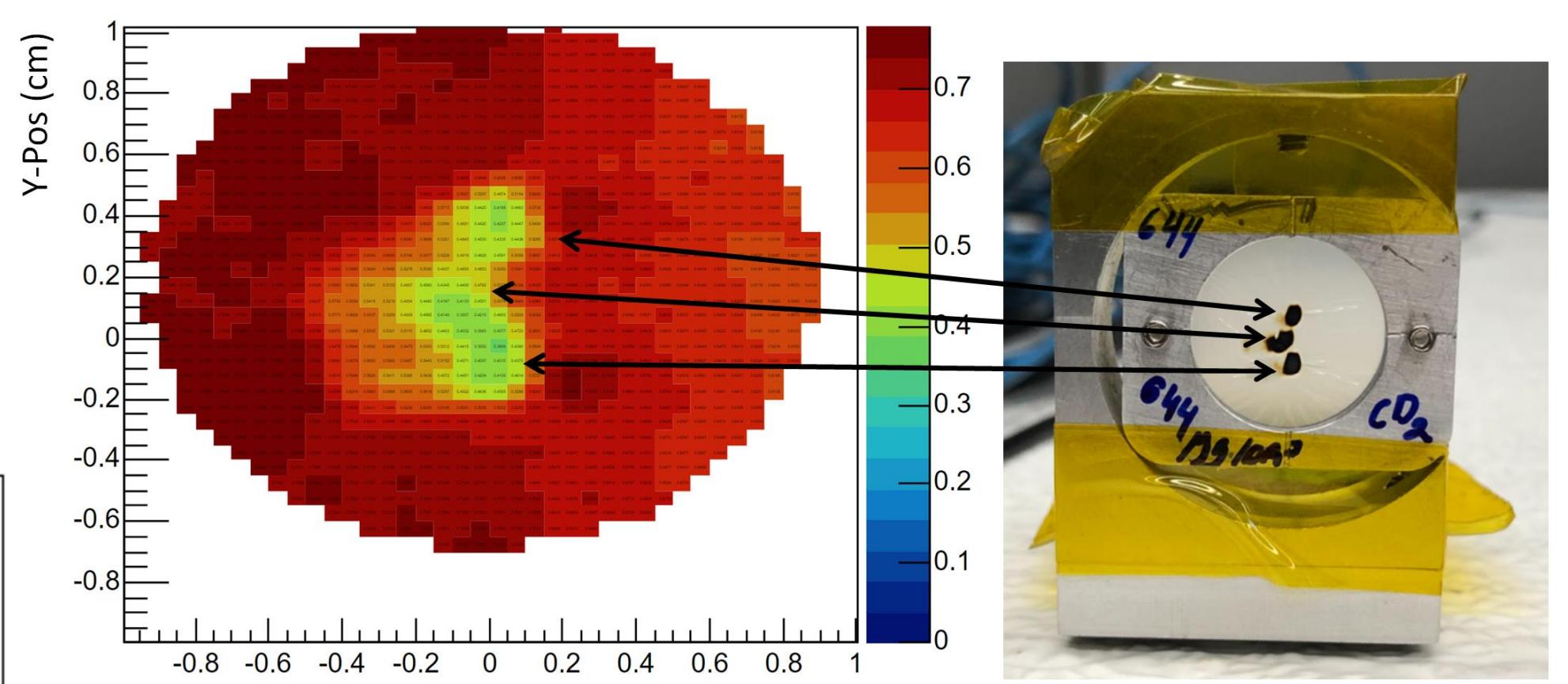
Efficiencies being checked with GEANT4



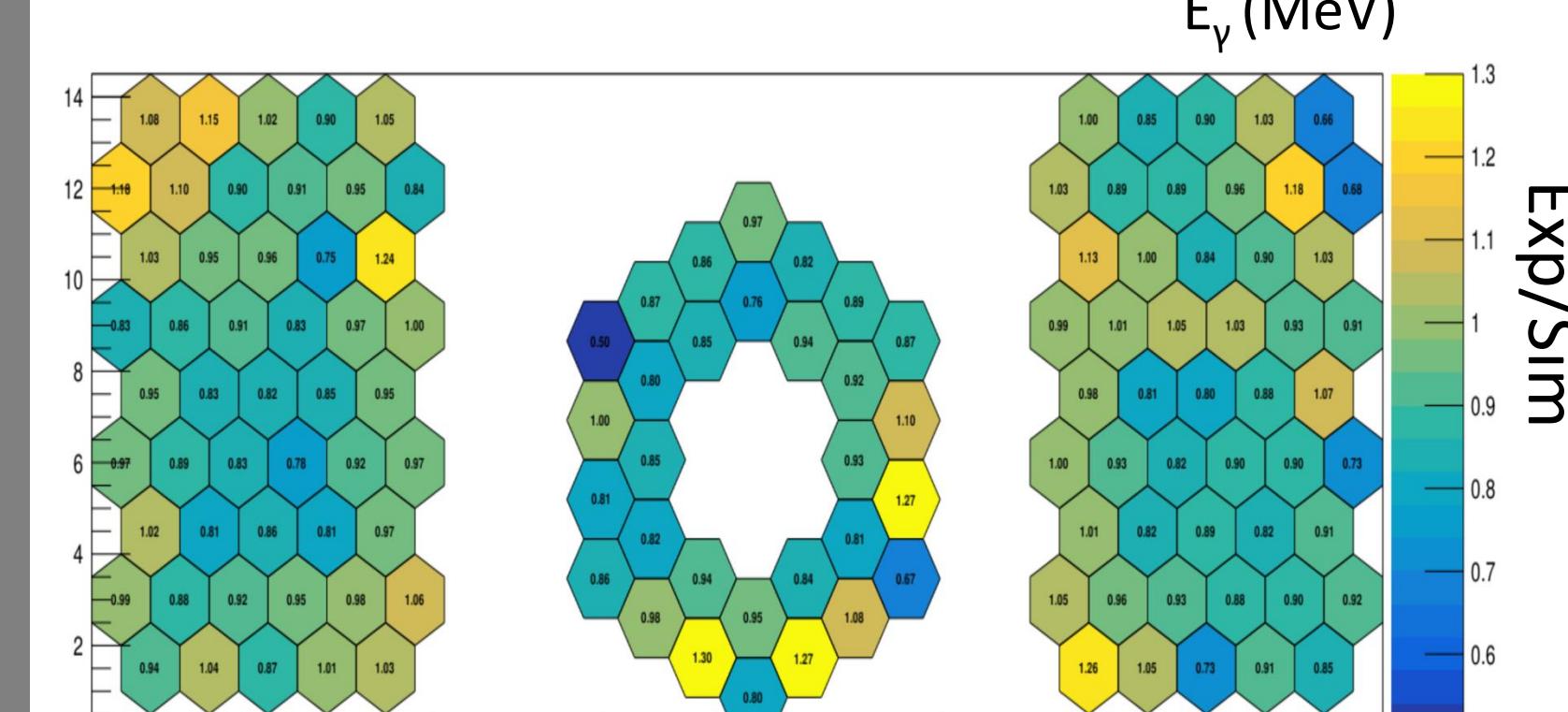
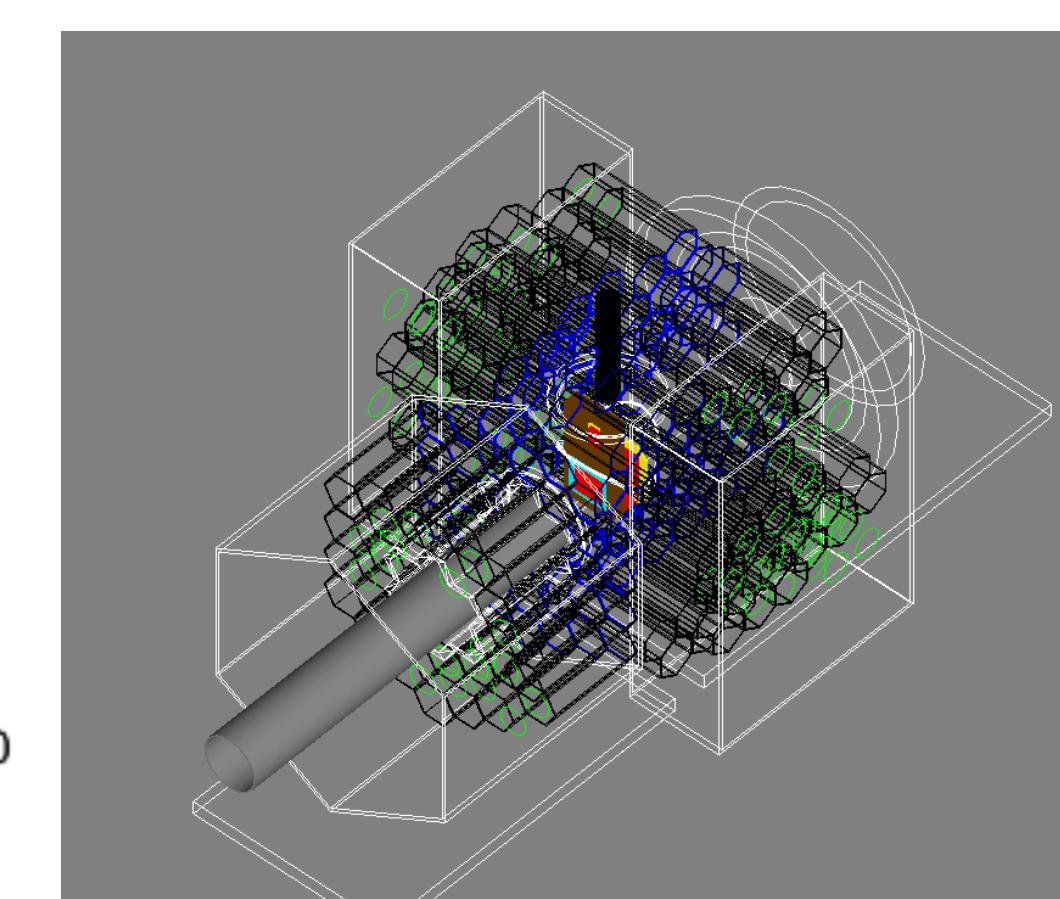
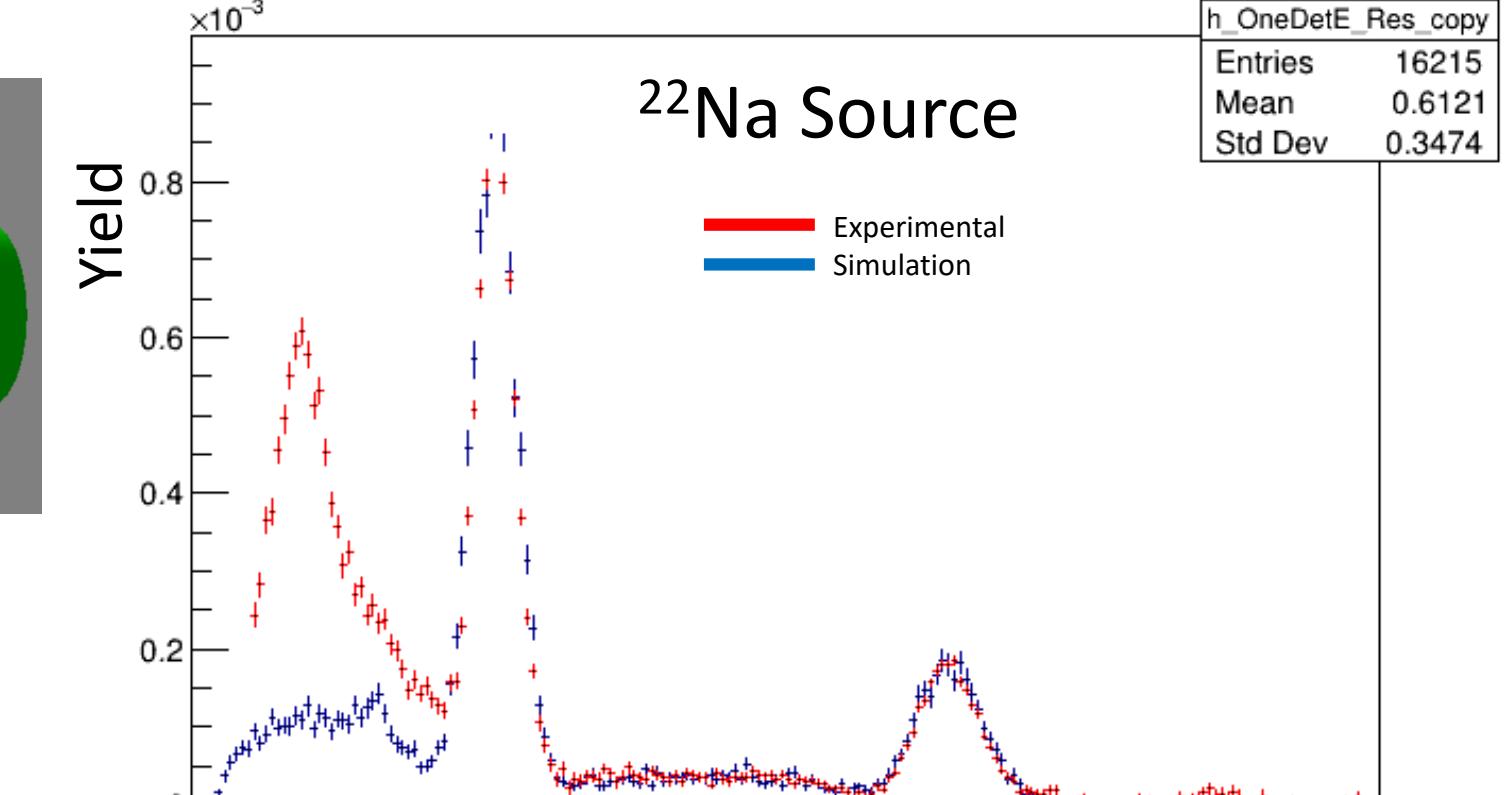
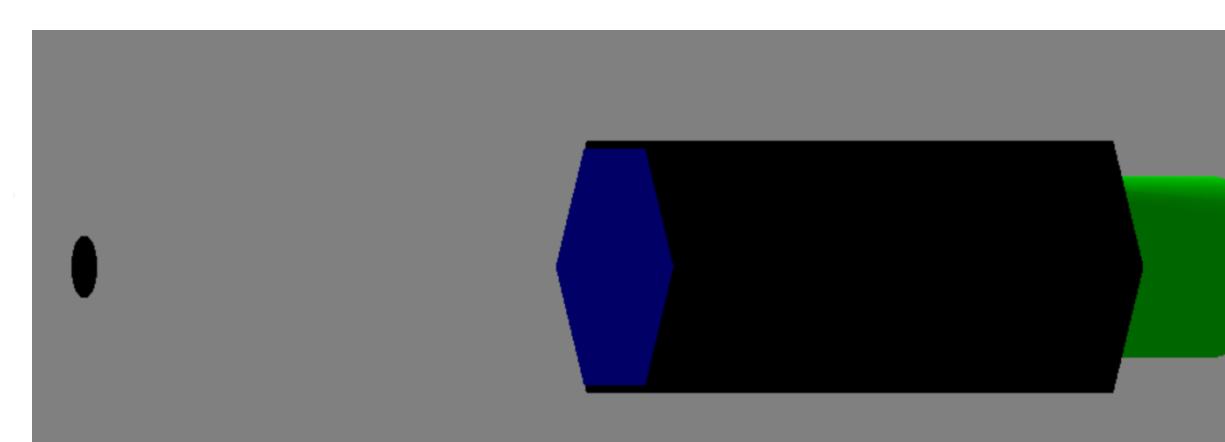
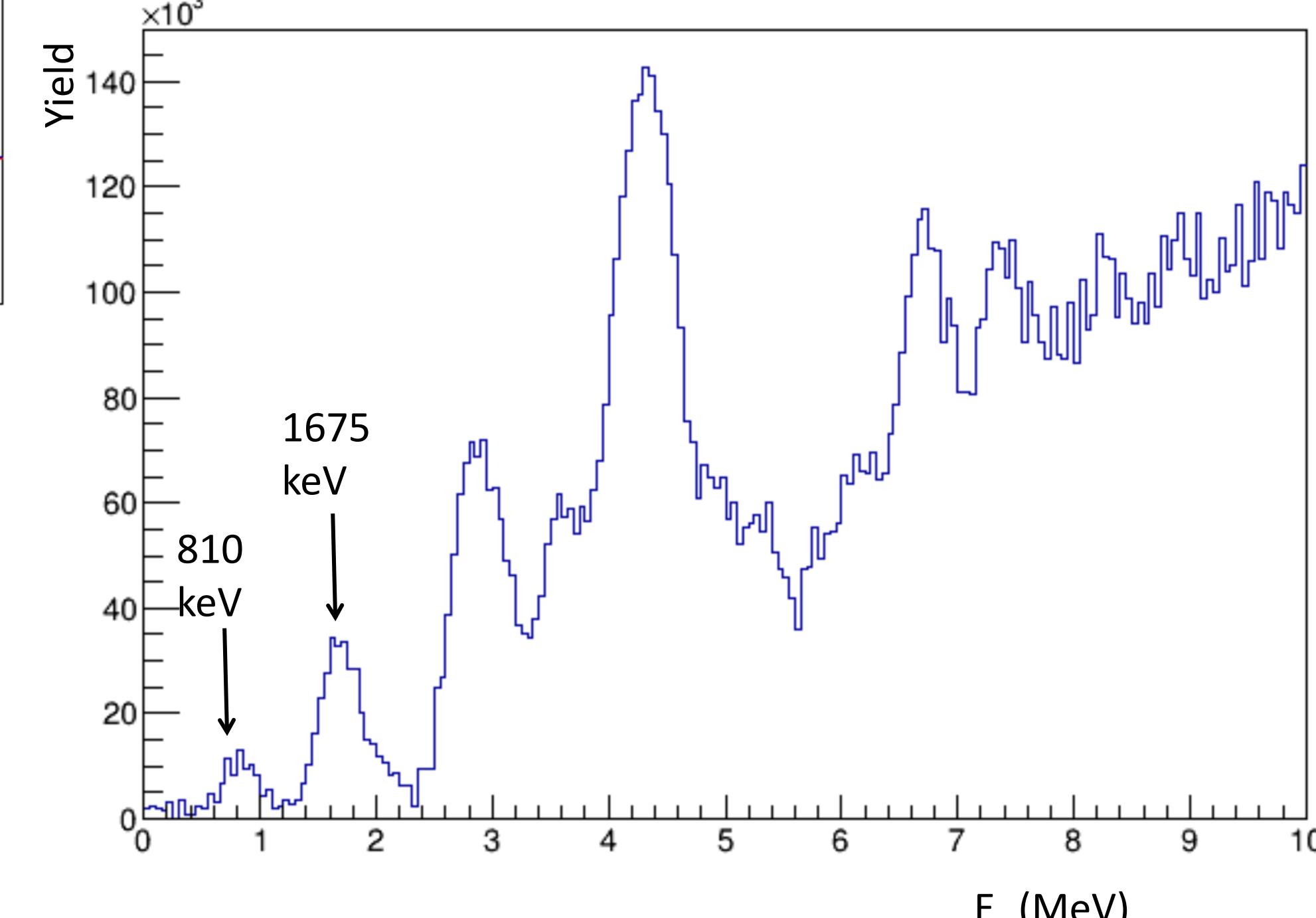
GEANT4 / Efficiency

GEANT4 of DAPPER required to generate response function

Current discrepancies exist in efficiencies in the data



Carbon Subtracted E* 58Fe



Acknowledgements

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