

Institute for Structure and Nuclear
Astrophysics

Current progress in experiments

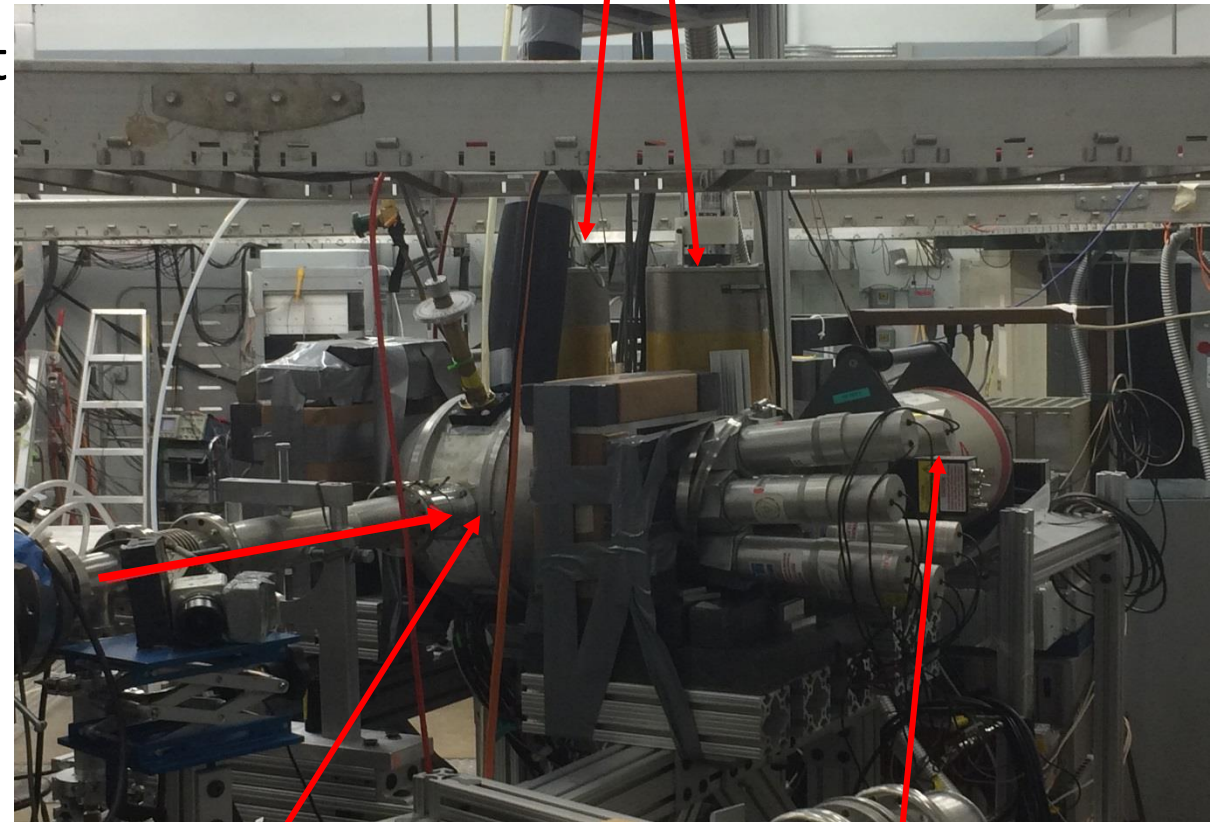
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A. Alikhanyan National Laboratory
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Experiment

- 7.75MeV bunched proton beam on ^{195}Pt
1.07mg/cm² target for $^{195}\text{Pt}(p,n)$
- 12MeV bunched proton beam on ^{196}Pt
1.34mg/cm² target for $^{196}\text{Pt}(p,n)$ and
 $^{196}\text{Pt}(p,2n)$

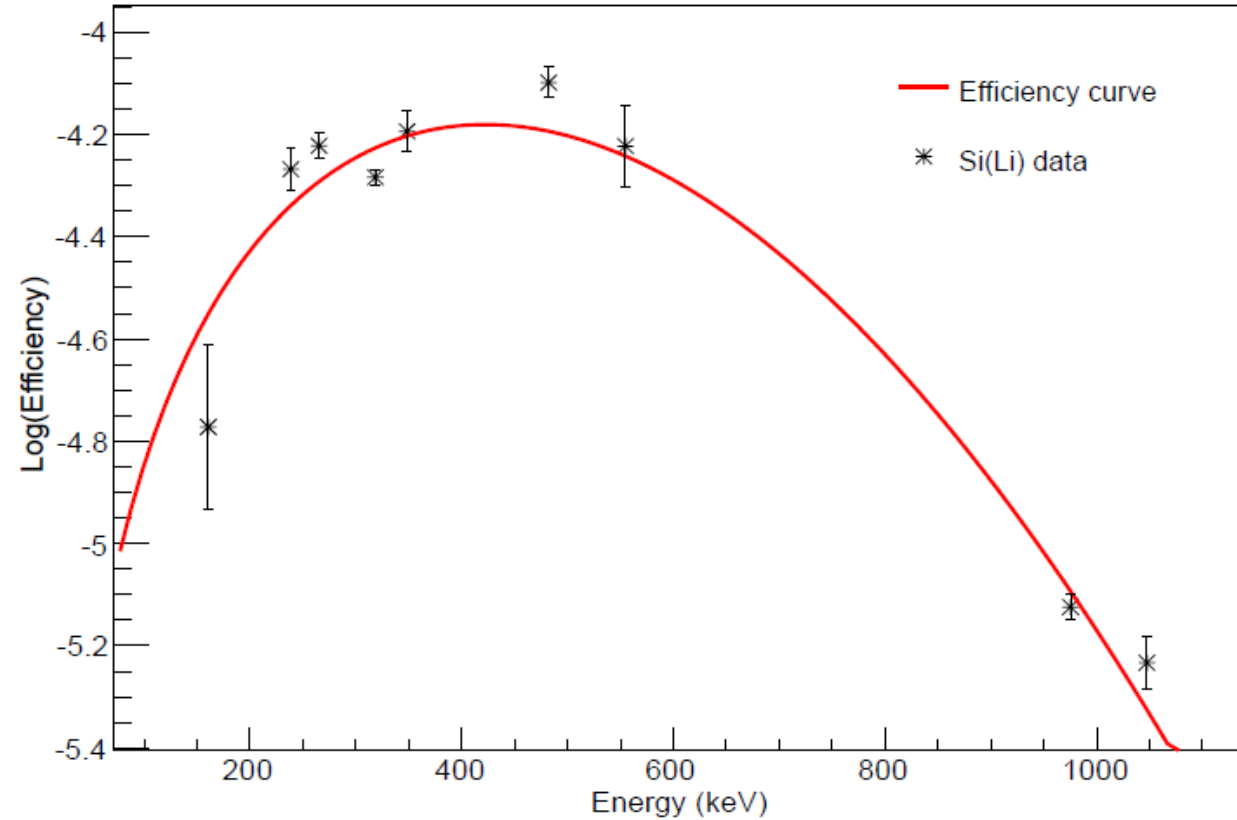
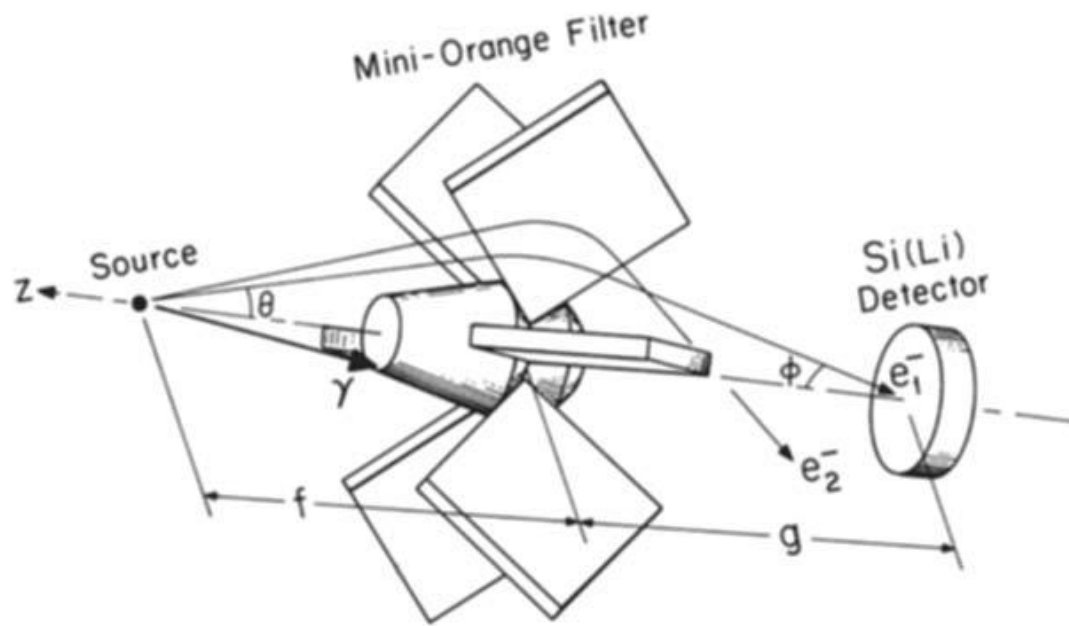


Neutron Detectors

ICEBall with 6 Si(Li)
detectors

HPGe Detector 109%
relative efficiency at
1332keV Energy

Detector efficiency



$$\ln(\epsilon(E)) = a + b * \ln(E) + c * E^2$$

¹³³Ba and ²⁰⁷Bi for Si(Li) calibration

New setup for better efficiency

FreeCAD

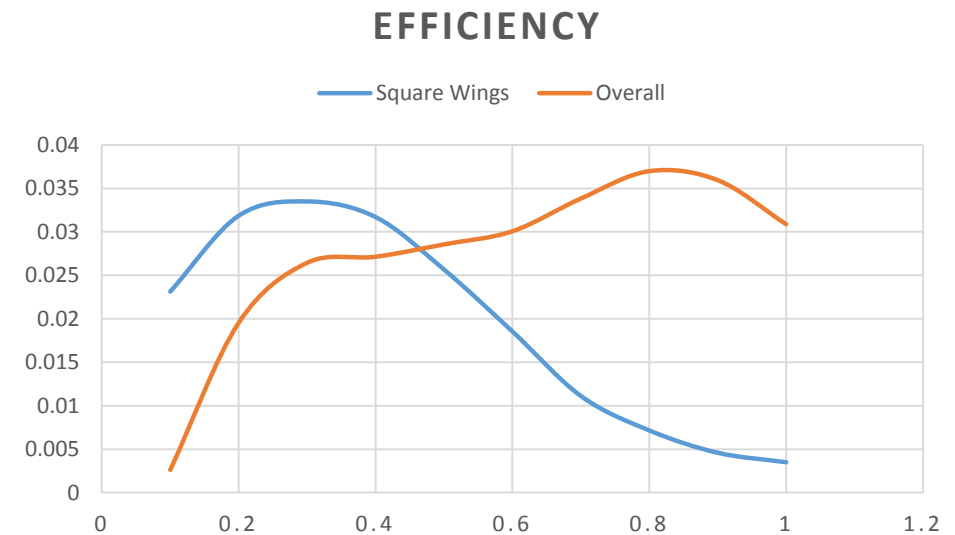
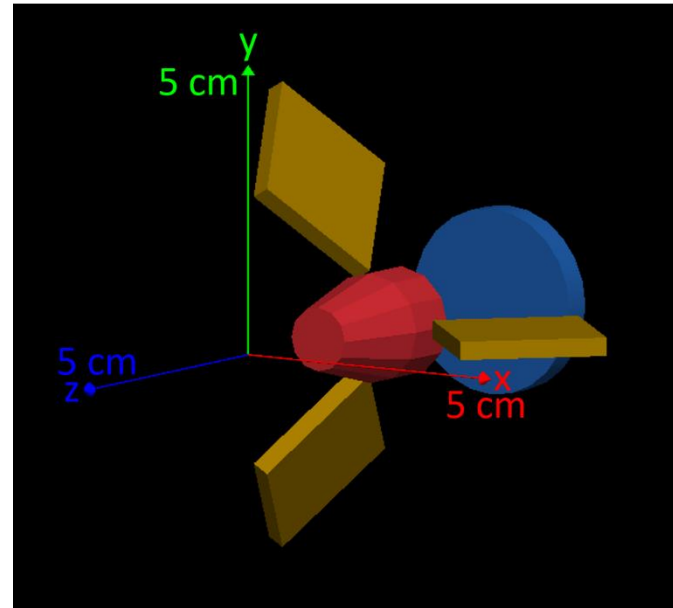
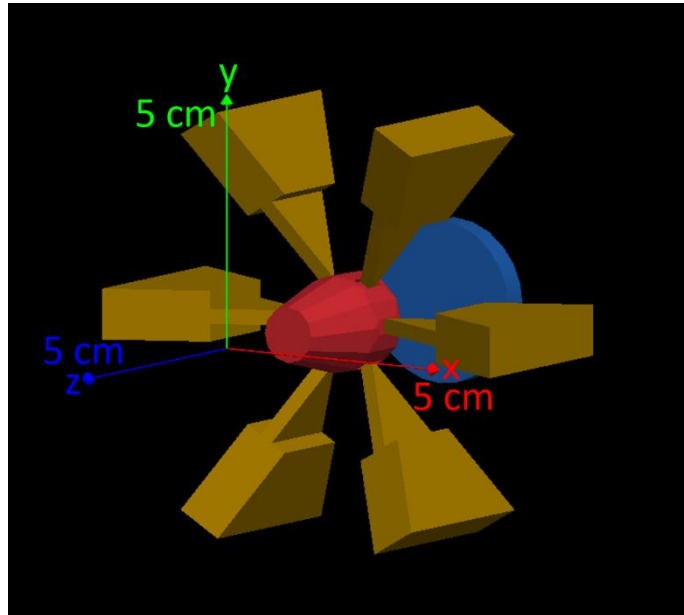
Design physical shape of filter

COMSOL

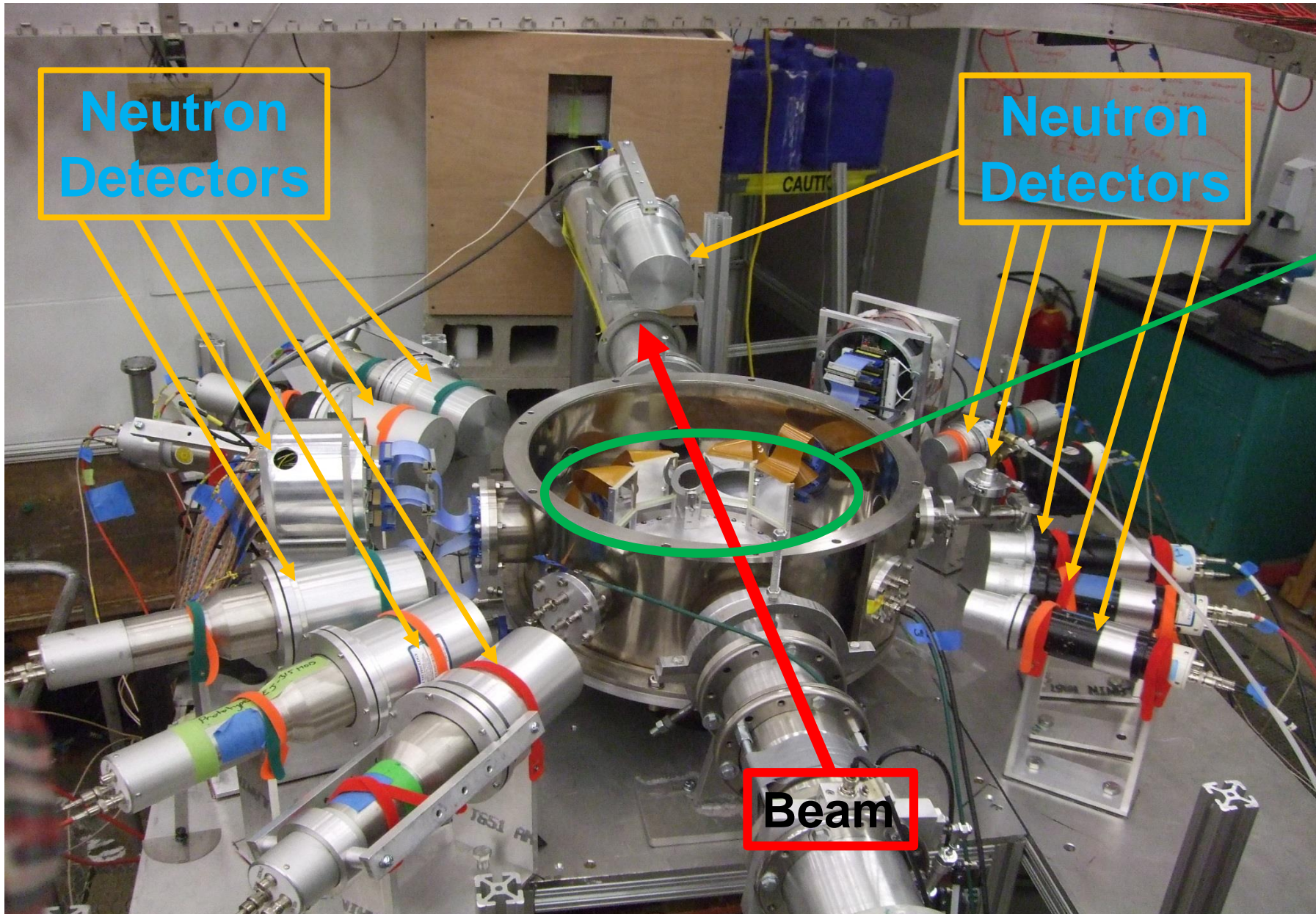
Generate magnetic field for each shape

Geant4

Final simulation for efficiency curve



Experimental Setup



Neutron
Detectors

Neutron
Detectors

Beam

Four 32x32 Double-
side Silicon Strip
Detectors (DSSD)

Total 256 channels

Beam energy: 24 - 29 MeV

Total: 12 Neutron Detectors

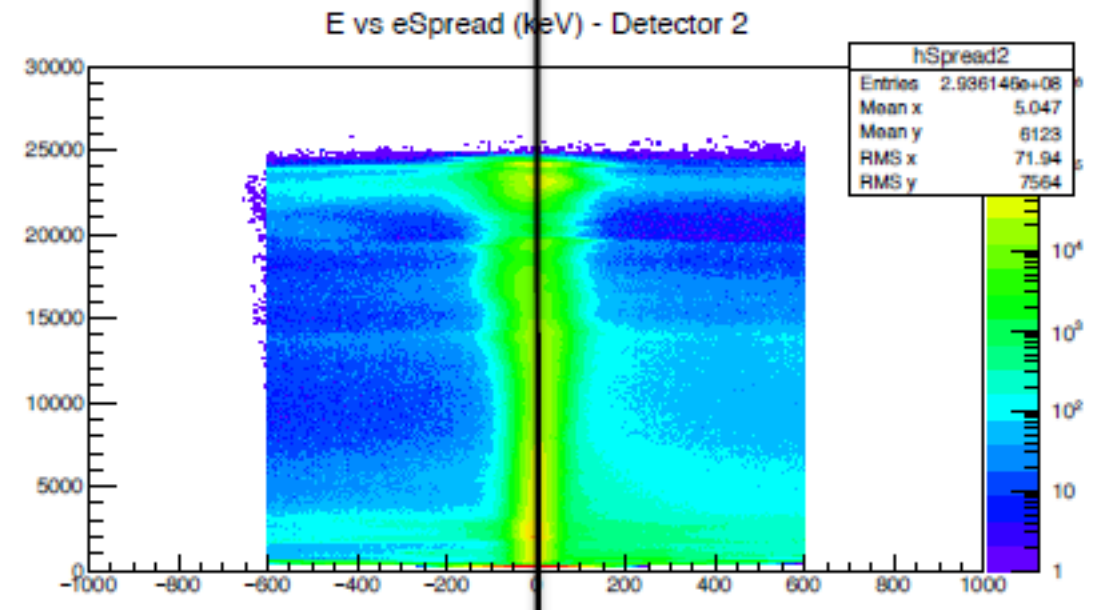
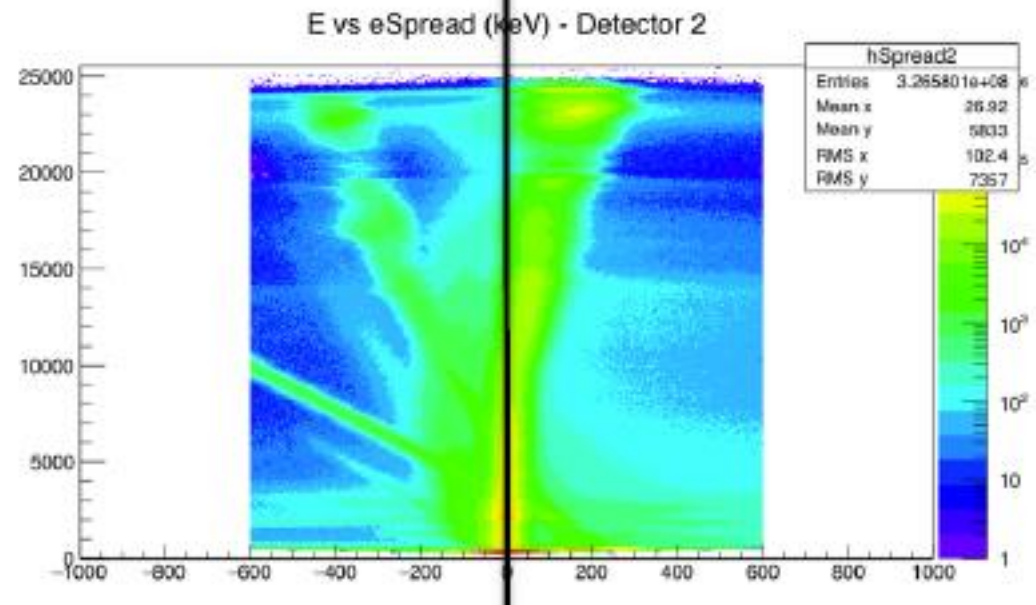
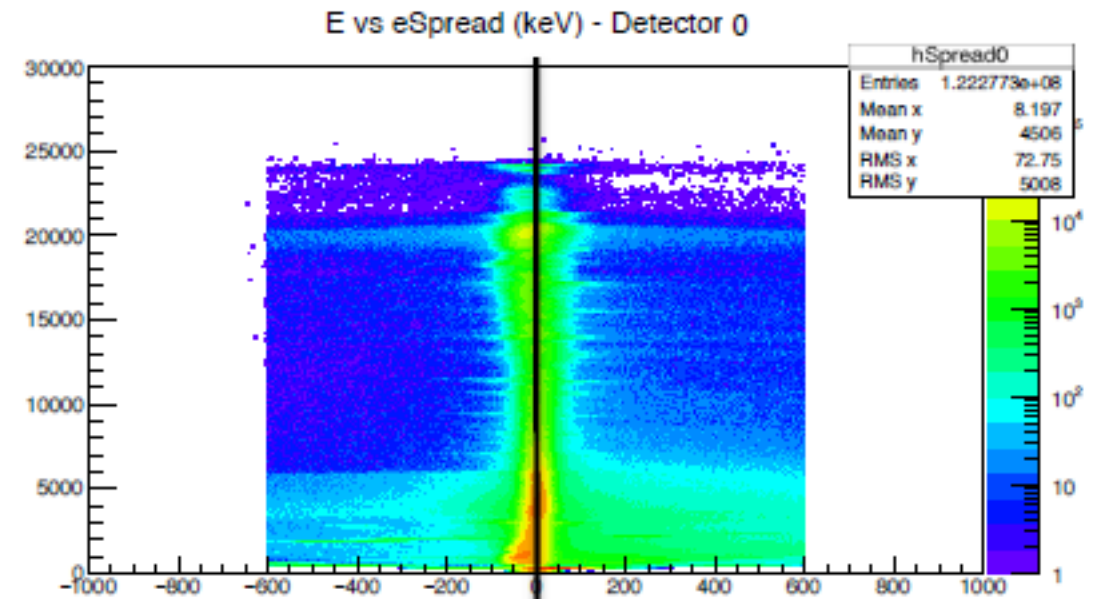
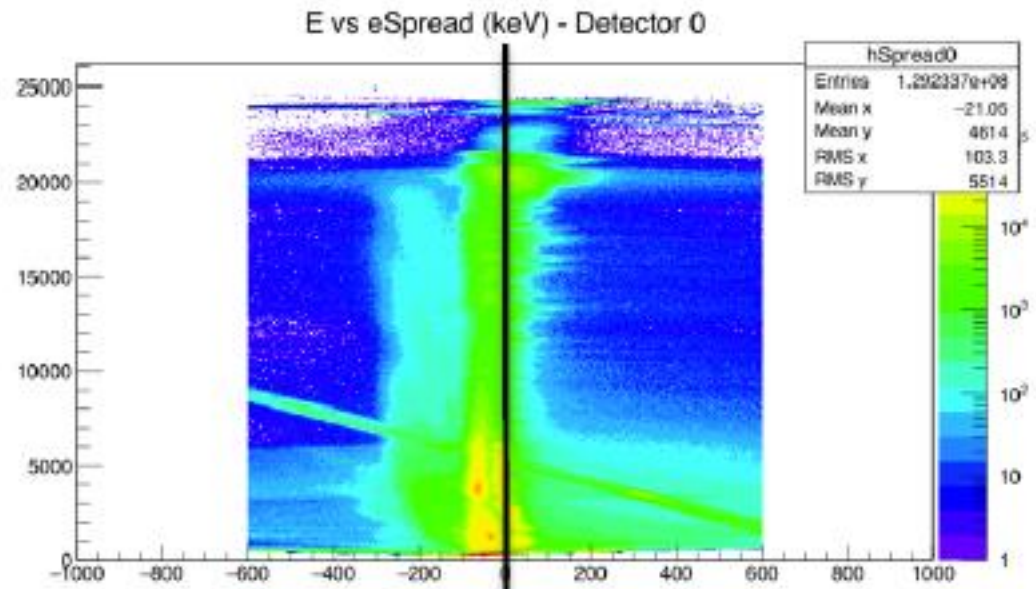
Sizes:

7 Detectors 4" x 6"

5 Detectors 2" x 2"

Angular Range: 22° - 146°

Corrections in linearity



Preliminary results

Ebeam	Excitation of 16O (MeV) (8Be+8Be)									
24			17.2106		18.1556	18.8484	19.4067			
25			17.2145		18.0675	18.7975	19.4535			
27.75			17.2147	17.4994	18.0213	18.8053	19.4269	21.0065	21.8326	
28.1			17.1865	17.4521	17.8719	18.8024	19.4129	20.9773	21.5522	
29.19			17.2107		17.9732	18.7541	19.3993	21.1362	21.6428	23.0047
Average			17.2074	17.4758	18.0179	18.8015	19.4199	21.0400	21.6759	23.0047
StDev			0.0118	0.0334	0.1058	0.0335	0.0214	0.0846	0.1431	#DIV/0!

Ebeam	Excitation of 16O (MeV) (12C+a)									
24		16.4508	17.1703	17.5935	18.0583	18.7566	19.4015			
25	15.3629	16.5148	17.1847	17.598	18.0971	18.7852	19.4766			
27.75		16.4438	17.1888	17.5953	18.1521	18.8376	19.5257	21.0805	21.7288	
28.1			17.2982		18.1224	18.7603	19.4191	20.9367	21.8313	22.5094
29.19			17.1823	17.5679	18.1123	18.6789	19.4717	21.0118	21.7503	22.171
Average	15.3629	16.4698	17.2049	17.5887	18.1084	18.7637	19.4589	21.0097	21.7701	22.3402
StDev	#DIV/0!	0.0391	0.0526	0.0140	0.0345	0.0574	0.0495	0.0719	0.0541	0.2393

Experiment at AANL

