Layout

- $^{112,118,124}Sn + ^{112,118,124}Sn$
- ~5 mg/cm^2 Targets
- 70 MeV/u beam energy

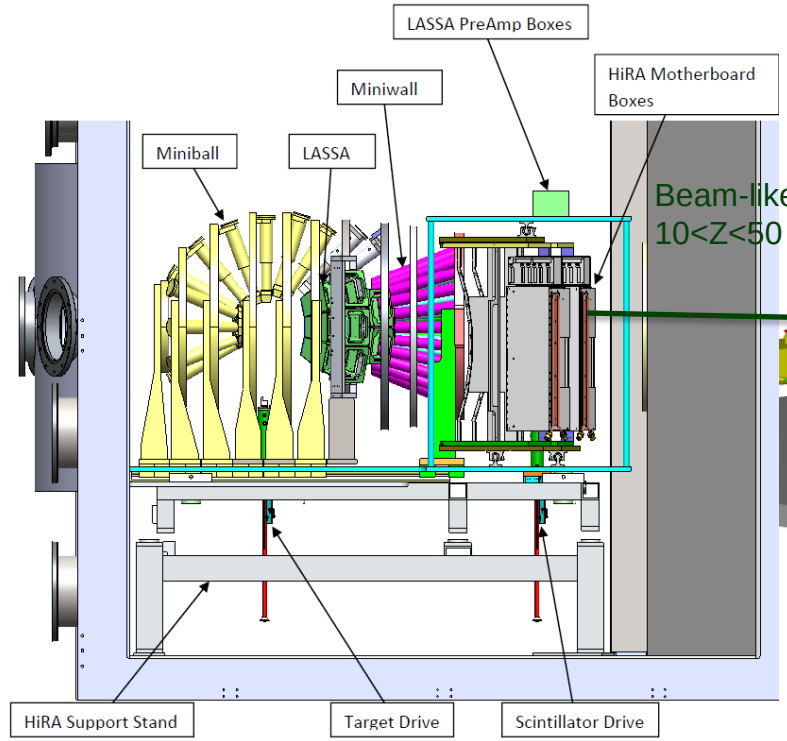
Layout

- Miniball->Charged particle multiplicity
- LASSA->Light ($Z \leq 6$) fragment distributions
- S800 Spectrograph -> Heavy ($Z \approx 25$-45) fragment distributions

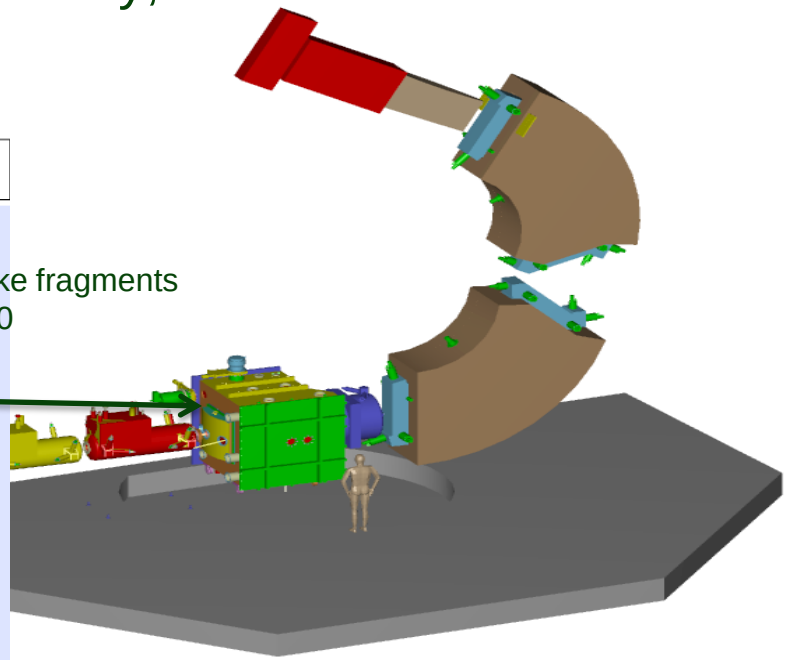
Experiment 07038: Precision Measurement of Isospin Diffusion

- Investigates the density-dependence of the nuclear symmetry energy
- ^{112,118,124}Sn+ ^{112,118,124}Sn Collisions
- Combines the MSU Miniball, the LASSA Array, and the S800 Spectrograph

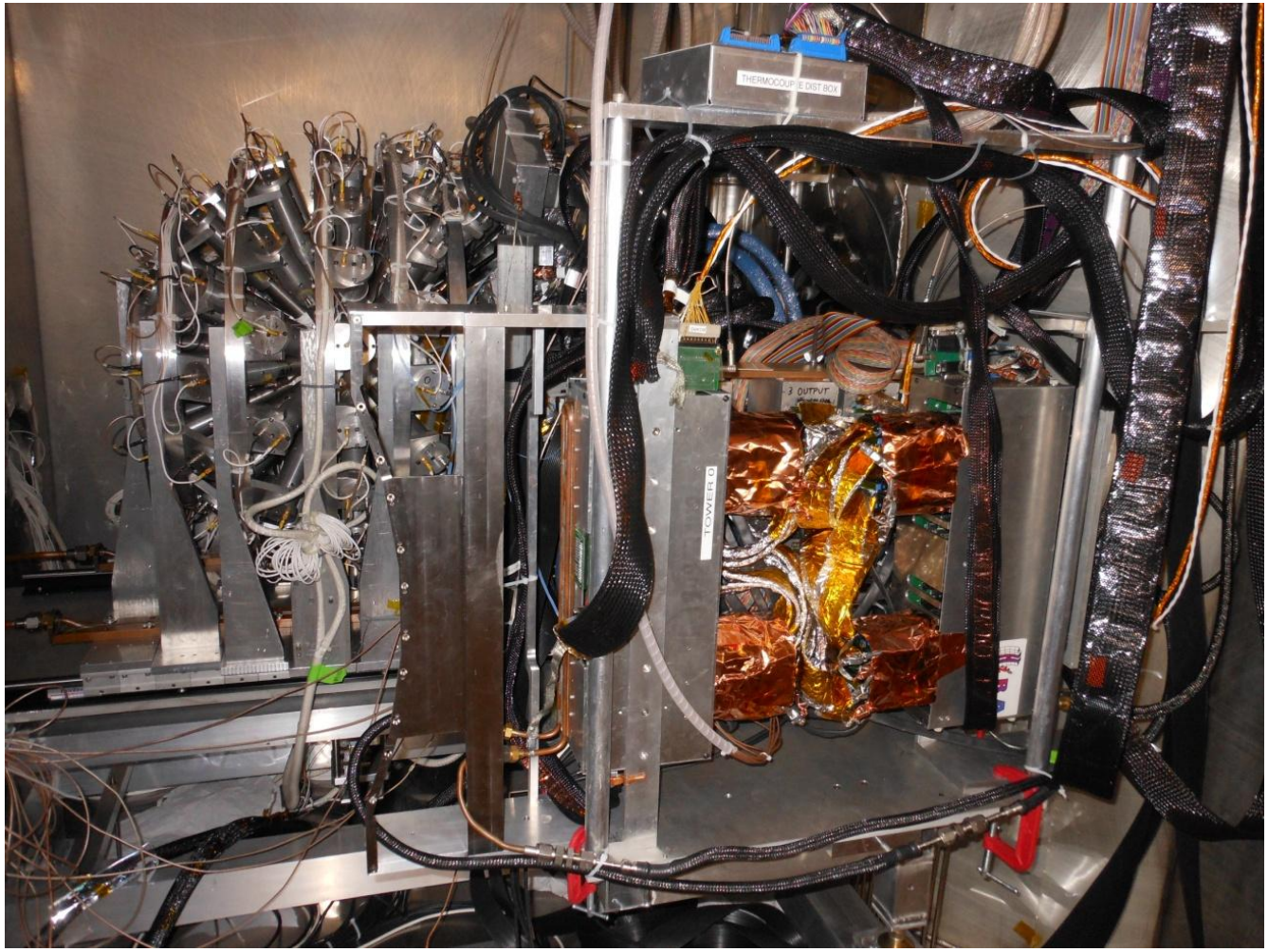
Incoming Beam,
70 MeV/u



Beam-like fragments
10<Z<50



Experiment 07038: Precision Measurement of Isospin Diffusion

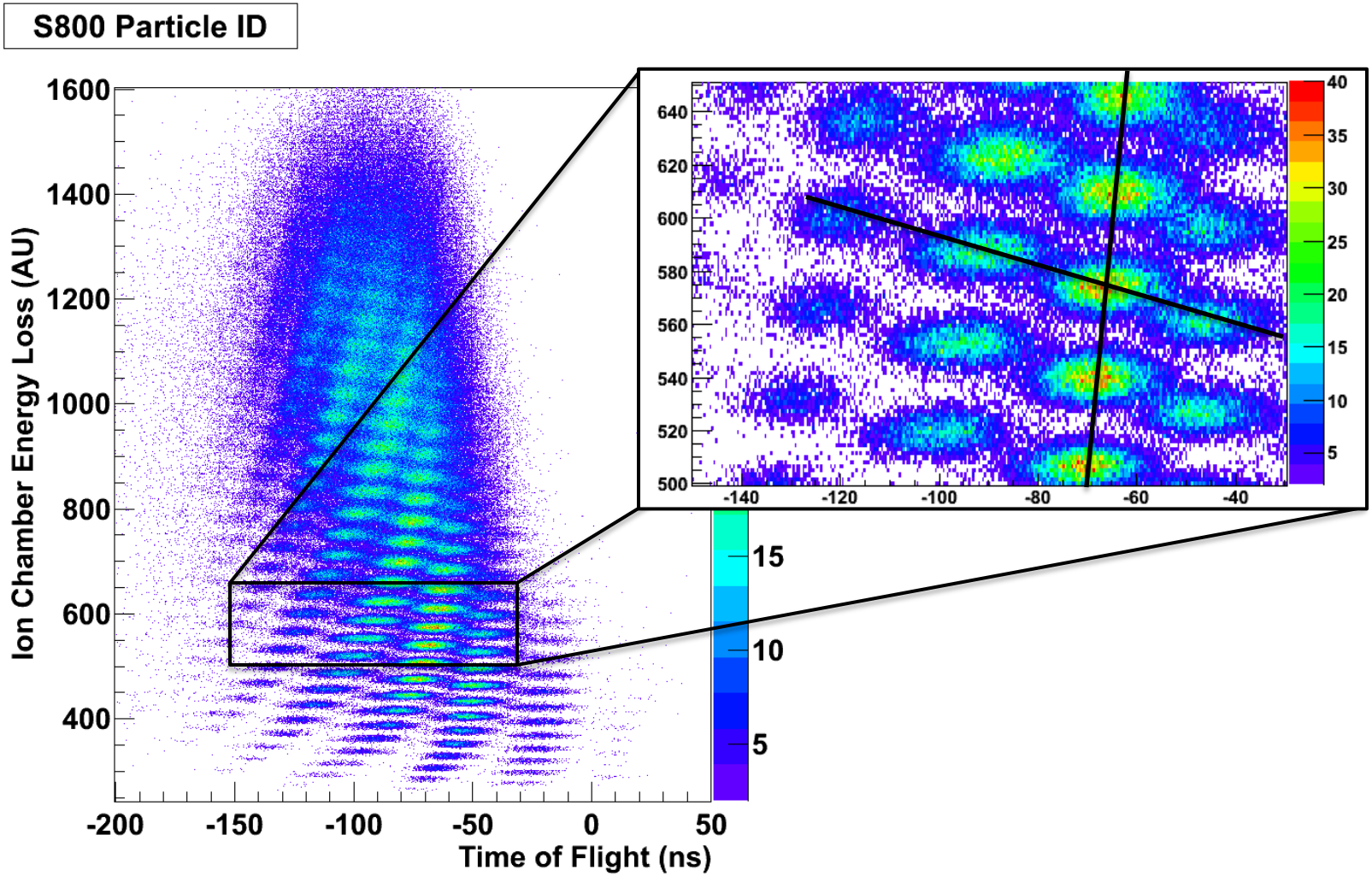


Experimental Trigger

- Miniball Mult=2 + S800 Single
- LASSA taken as a slave

The S800 Spectrometer

Separates isotopes (Z≈10-50) by comparing ΔE, TOF, and Bρ

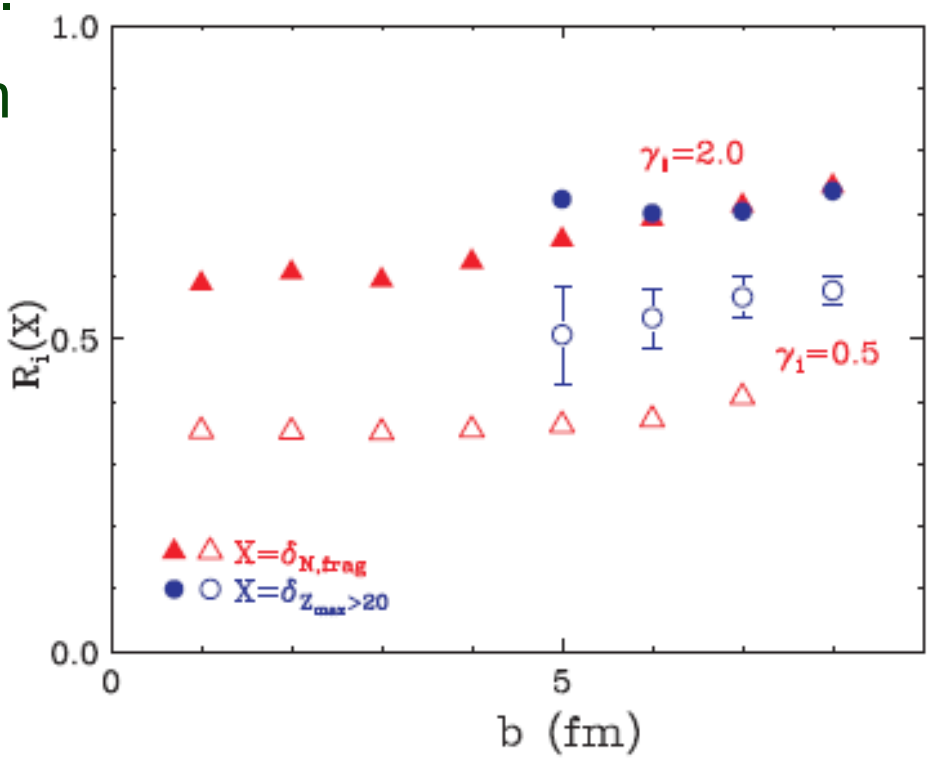


Beam Rates

- Event rates 200-300/s
- Beam Rate $2*10^7$/s to $6*10^7$/s
- Limited by transmission through S800
- Total Events about 3 million/beam-target-brho, or about 10 million/beam-target

Main Goal: Isospin Transport in Residues

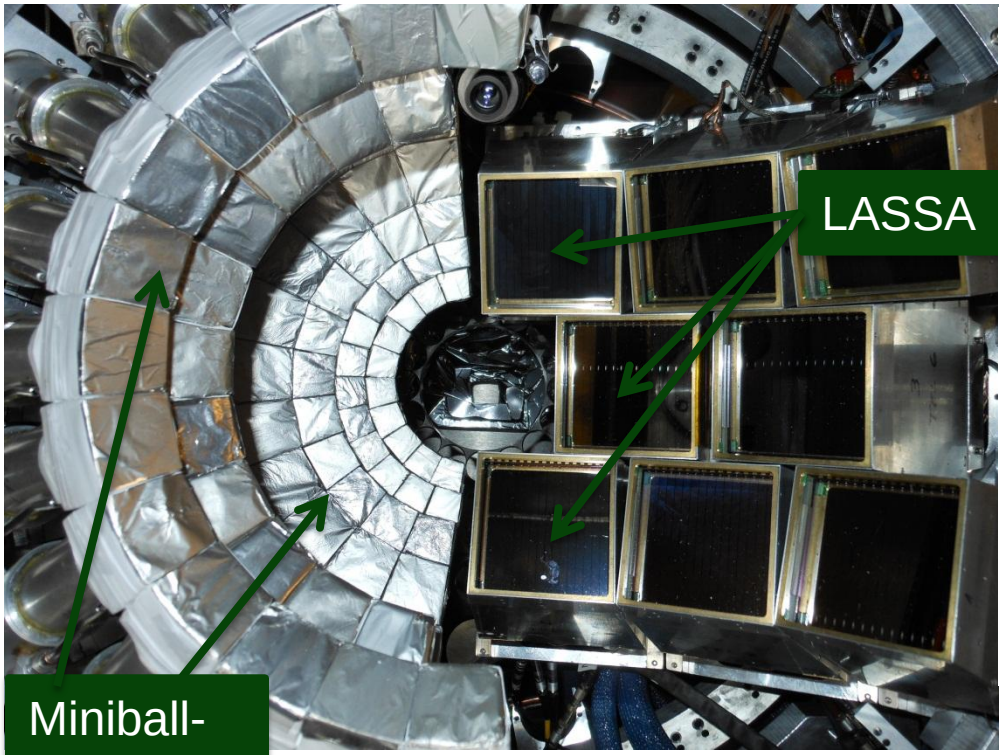
- Different amount of isospin diffusion for heavy residues.
- We will measure the isospin transport for the residue using the S800 spectrograph in addition to measuring the fragment distributions.



$$E_{sym}(\rho) = S_k\left(\frac{\rho}{\rho_0}\right)^{2/3} + S_i\left(\frac{\rho}{\rho_0}\right)^{\gamma_i}$$

The MSU Miniball/WU Miniwall

- Total charged particle multiplicity is related to impact parameter



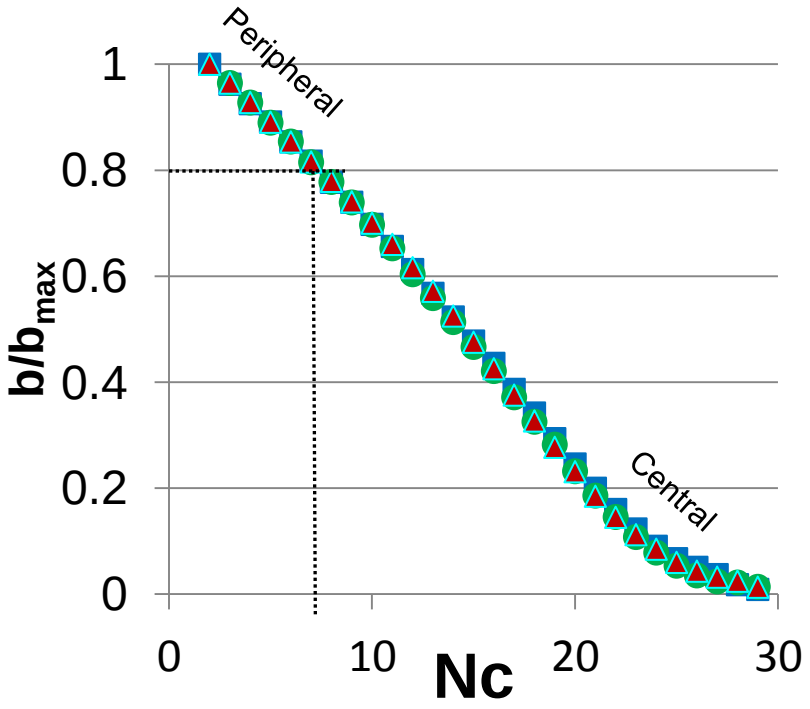
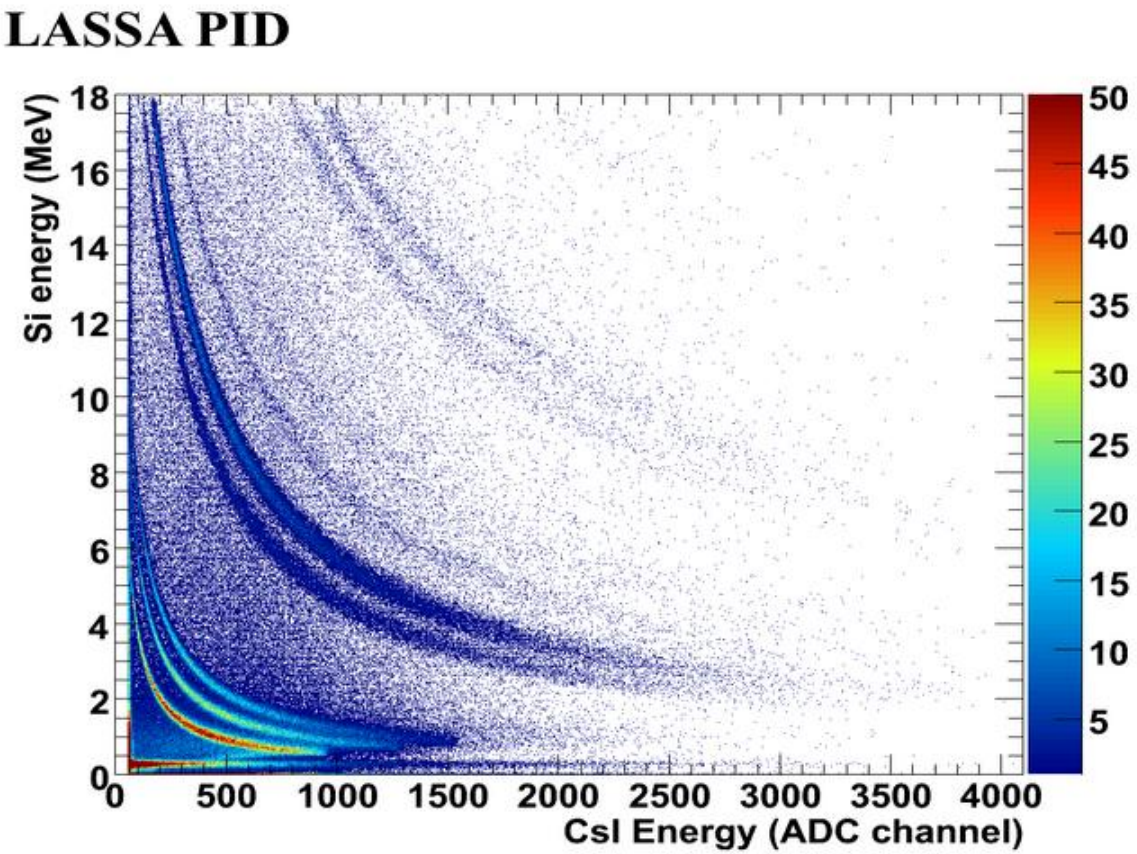
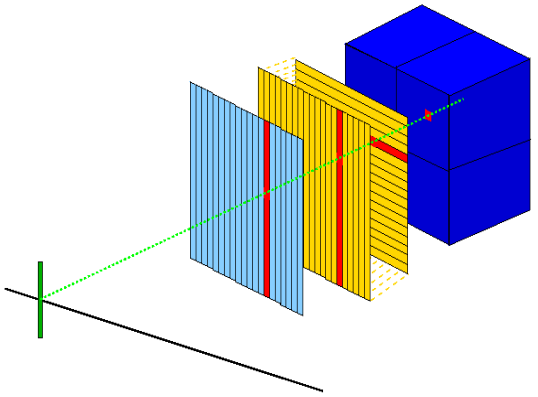
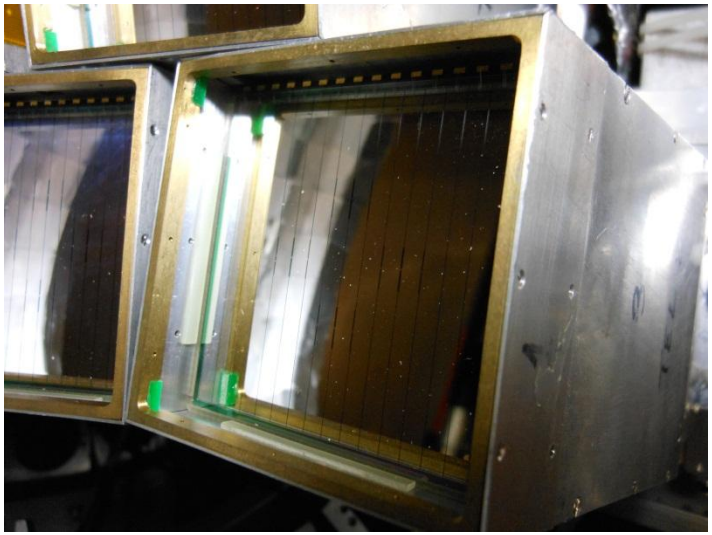


Figure: Andira Ramos (CEU Poster)

The LASSA Array







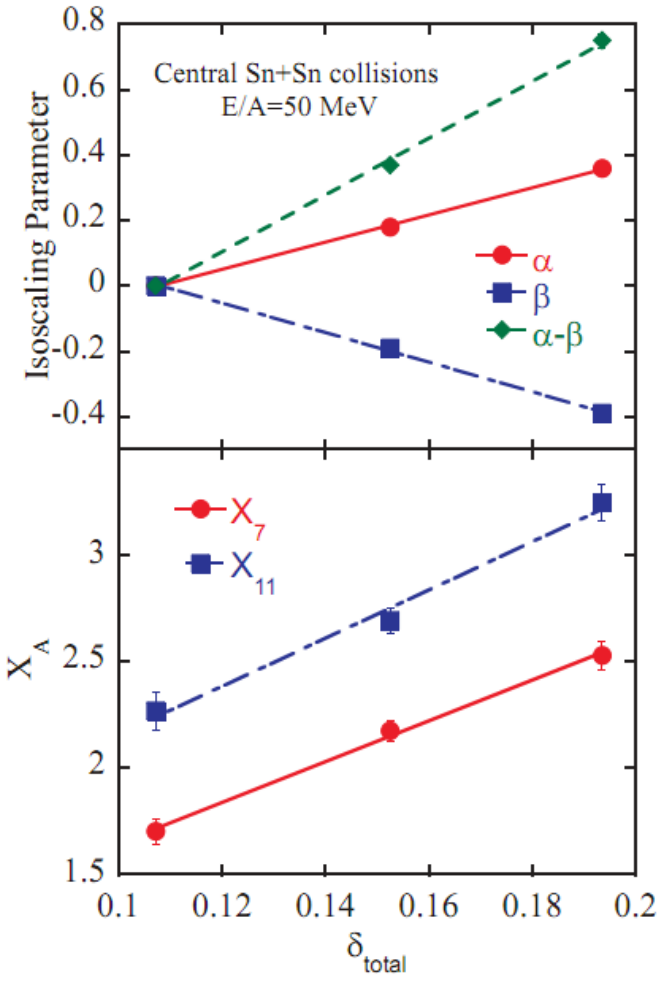
Timeline

- Experiment start: May 30, 2011
- Interruption due to cryoplant problems
- Experiment Finish: Oct 19, 2011 (teardown in progress, ask for a tour)
- Data taken (Millions of events):

Beam	Target		
	^{112}Sn	^{118}Sn	^{124}Sn
^{112}Sn	11.4	x	8.7
^{118}Sn	3.8	10.7	x
^{124}Sn	12.3	10.1	15.2

Confirm Linearity of α on δ

- α depends linearly on the asymmetry according to statistical and dynamic models.
- Experimentally verified in central collisions.
- Measure ^{118}Sn on ^{118}Sn to add a data point to ^{112}Sn + ^{112}Sn and ^{124}Sn + ^{124}Sn.



The S800 Spectrometer