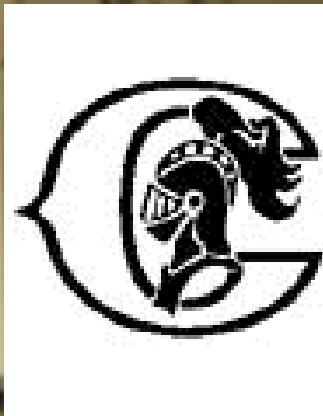


HiRA deadlayer determination at the NSCL

Research Experience for Undergraduates (2006)

Glen Perry (Carleton College)

MICHIGAN STATE
UNIVERSITY

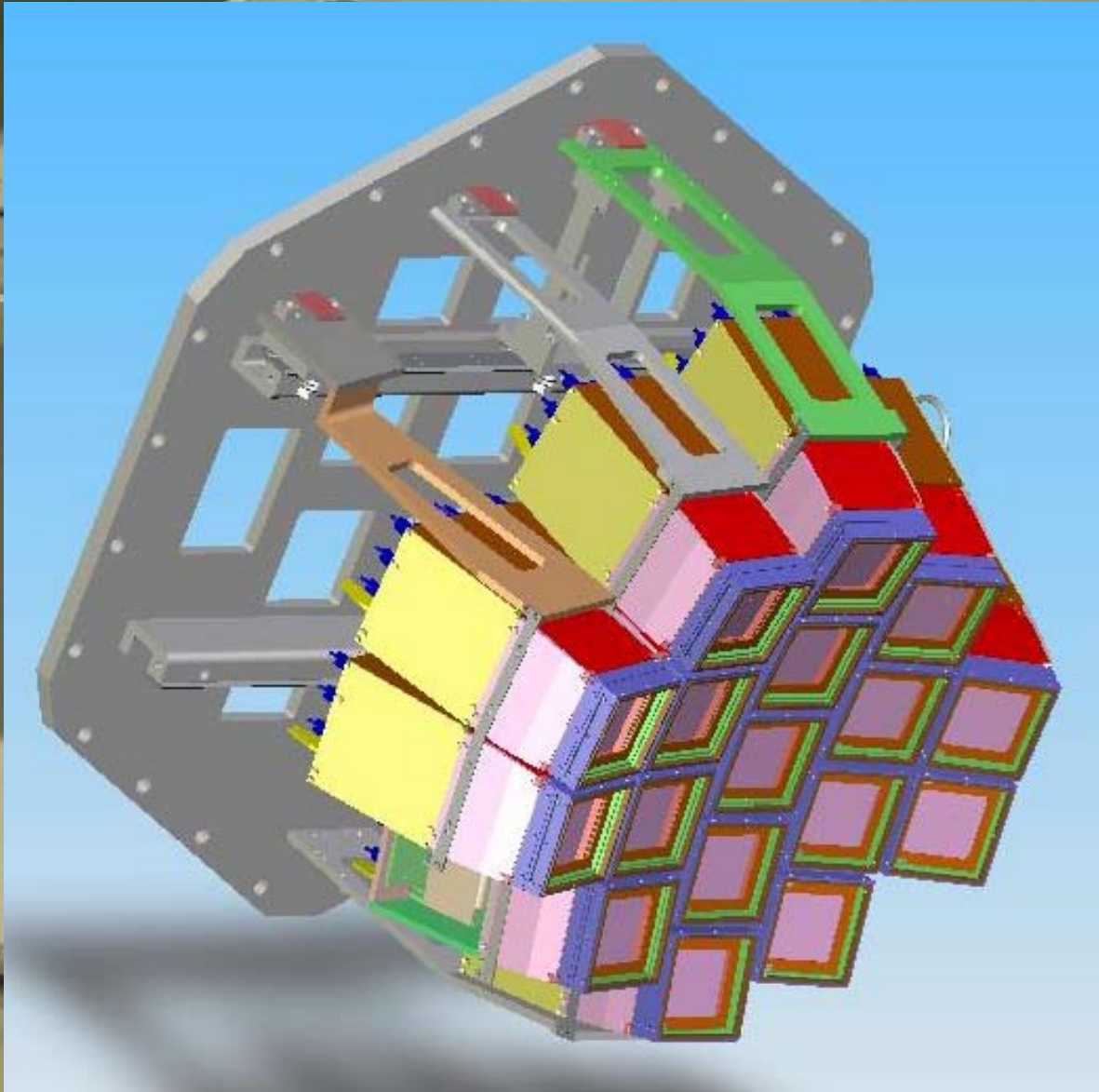


Outline

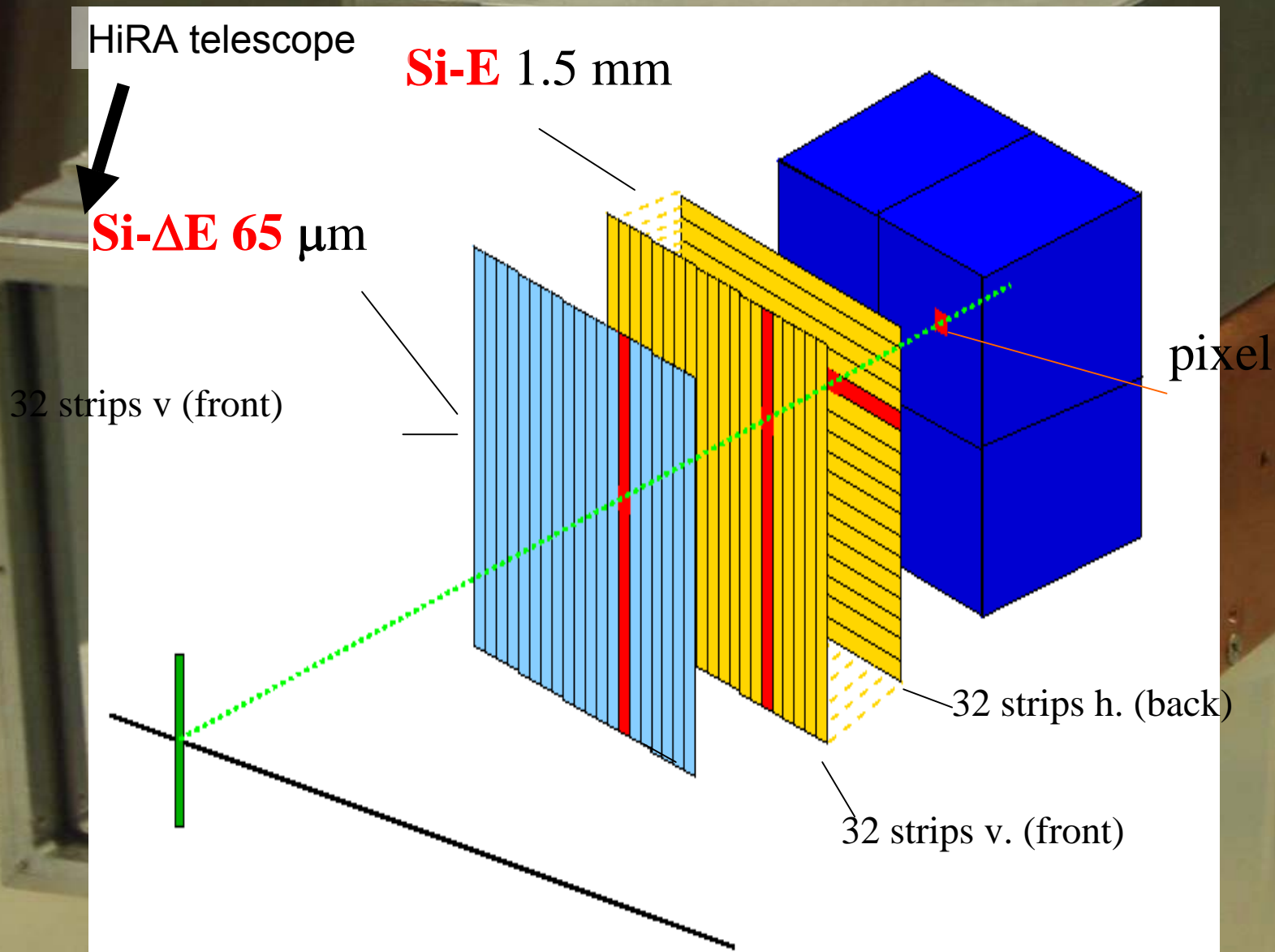


- HiRA
- Detectors (why characterization necessary)
- Experimental approach
- Problems/limitations
- Results

HiRA (High Resolution Array)

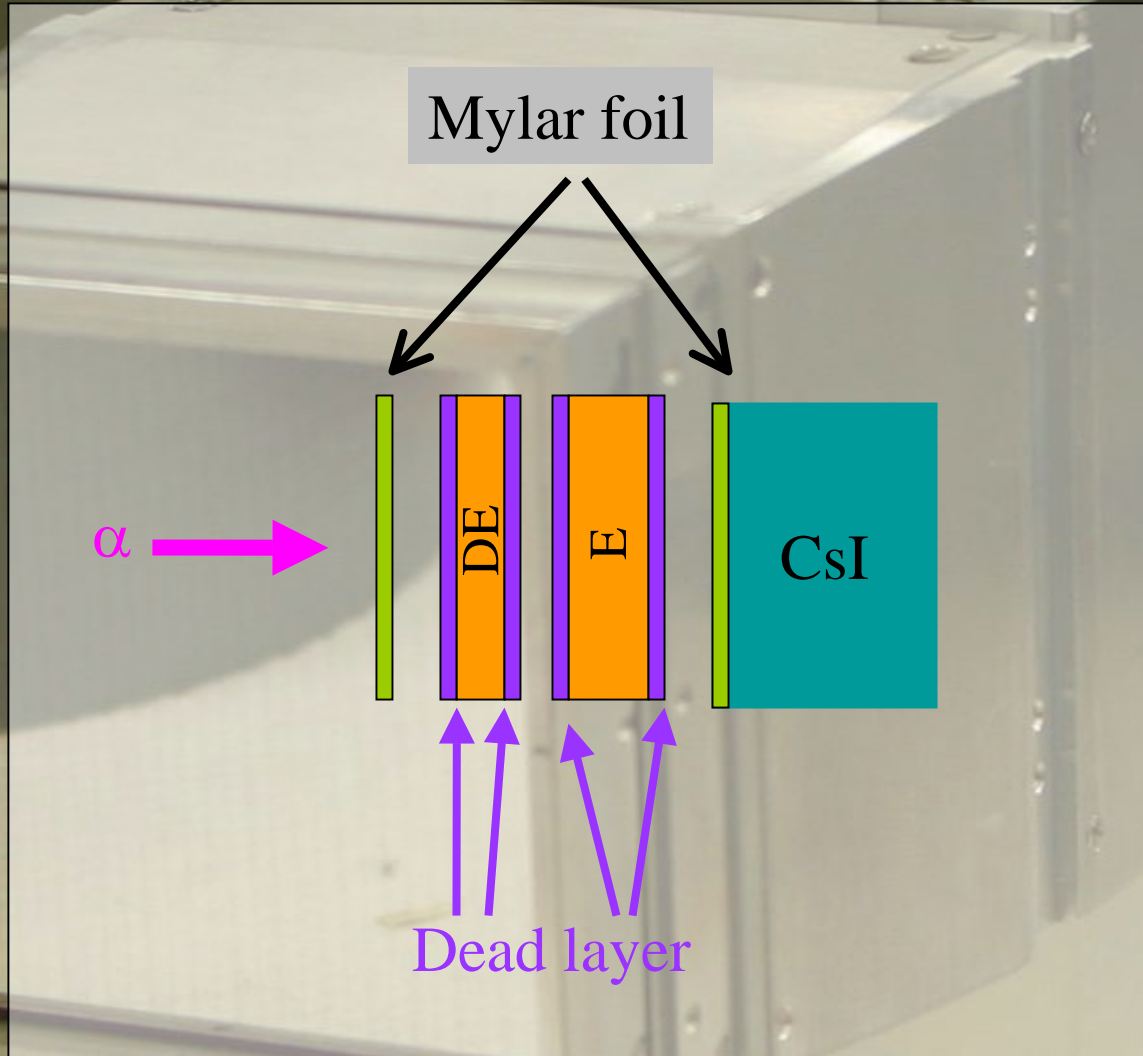


HiRA Telescopes

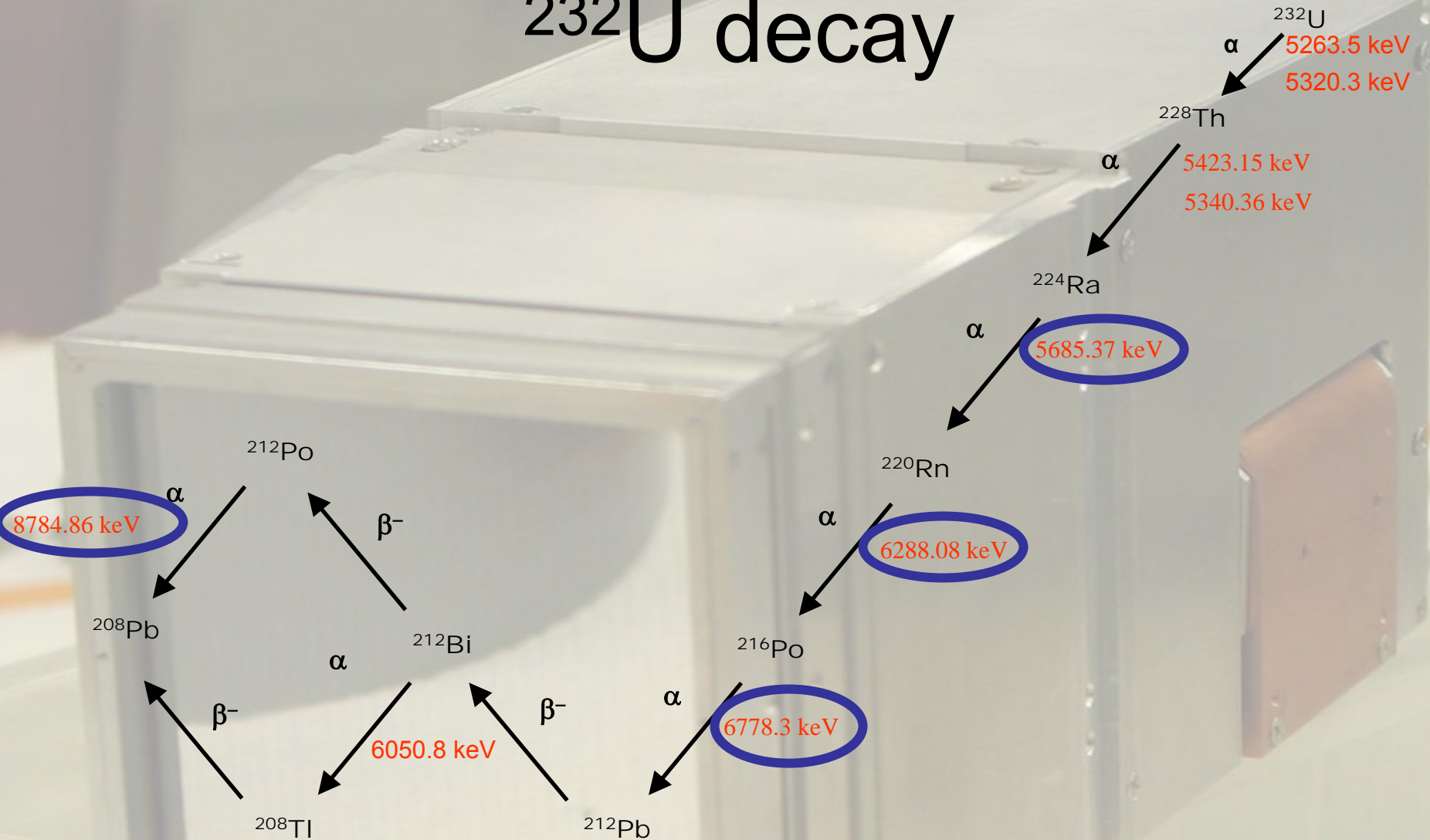


Dead layer

- Important for accurate calibration and data analysis

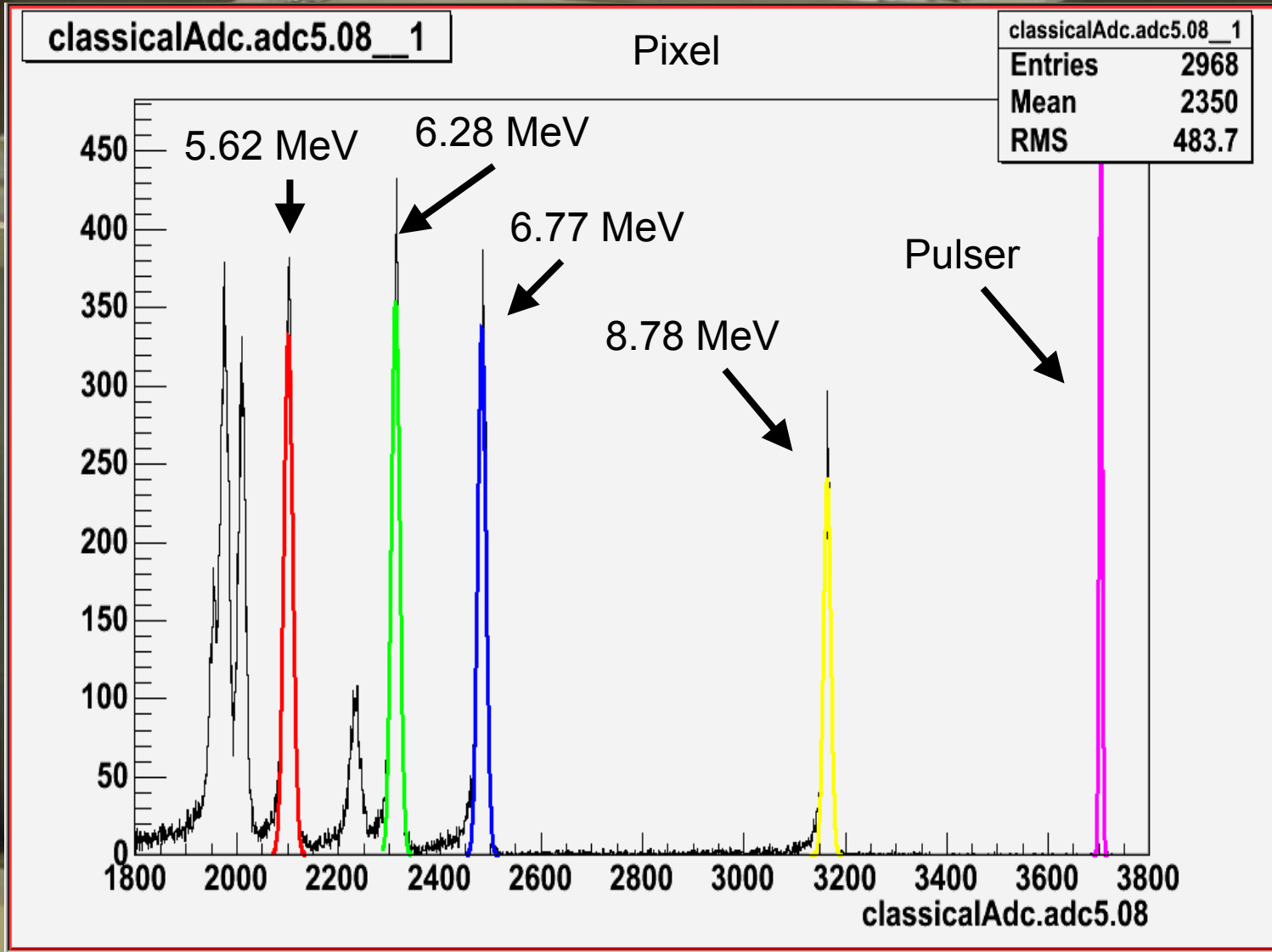


^{232}U decay

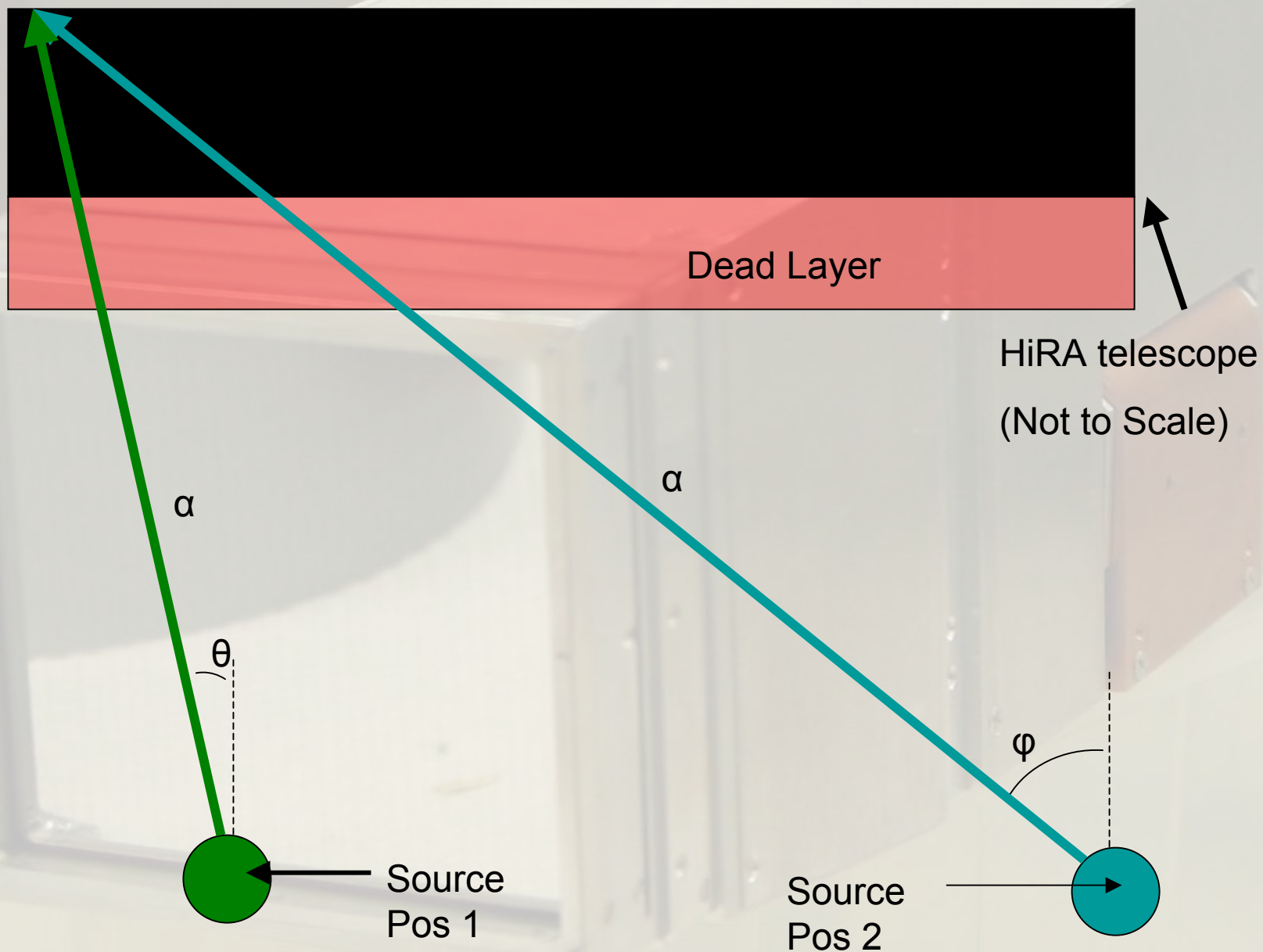


^{232}U source fitting

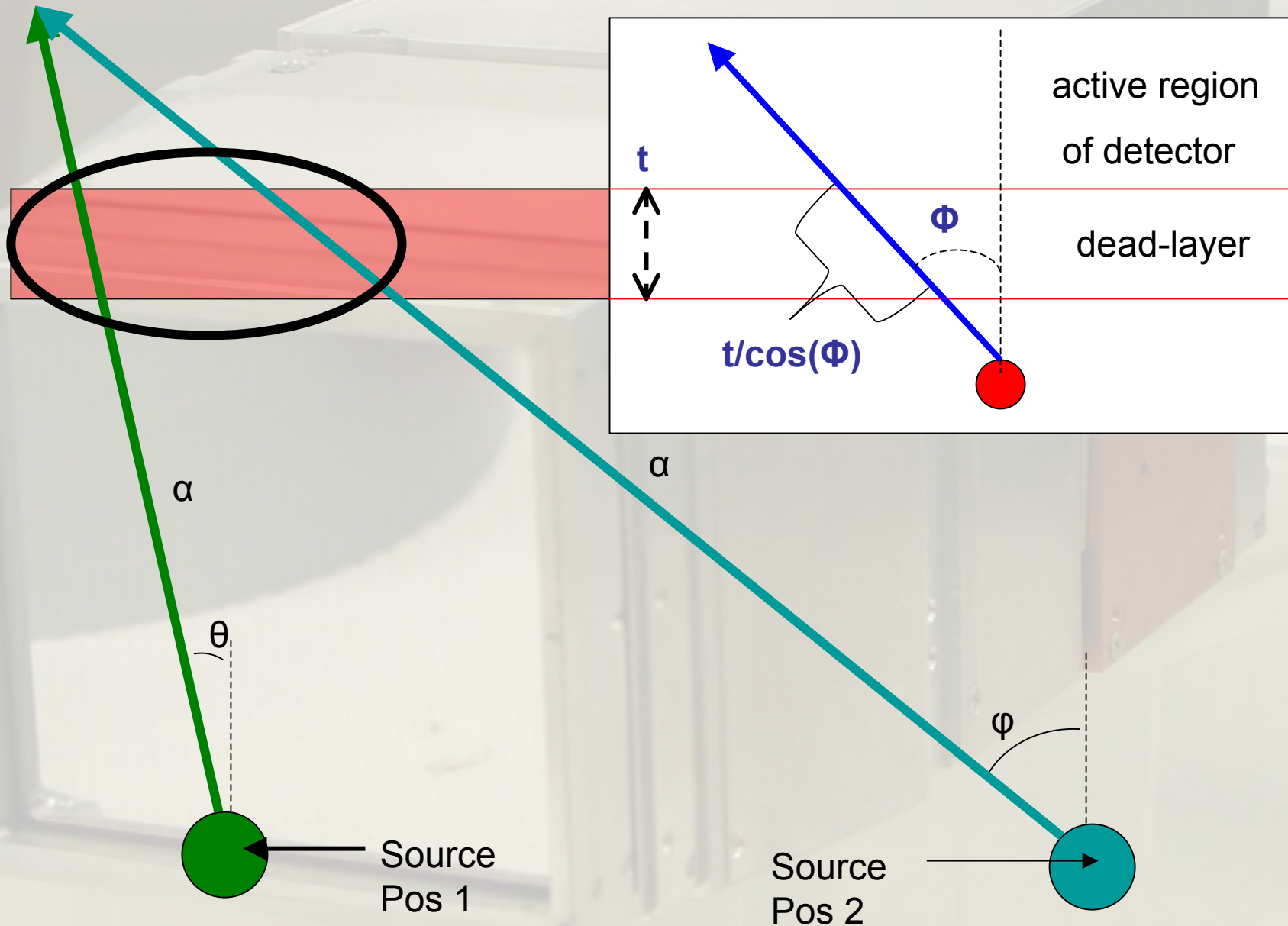
- Pixels made by gating EF strips via EB strips



Experimental Setup (vertical view)



Experimental Setup



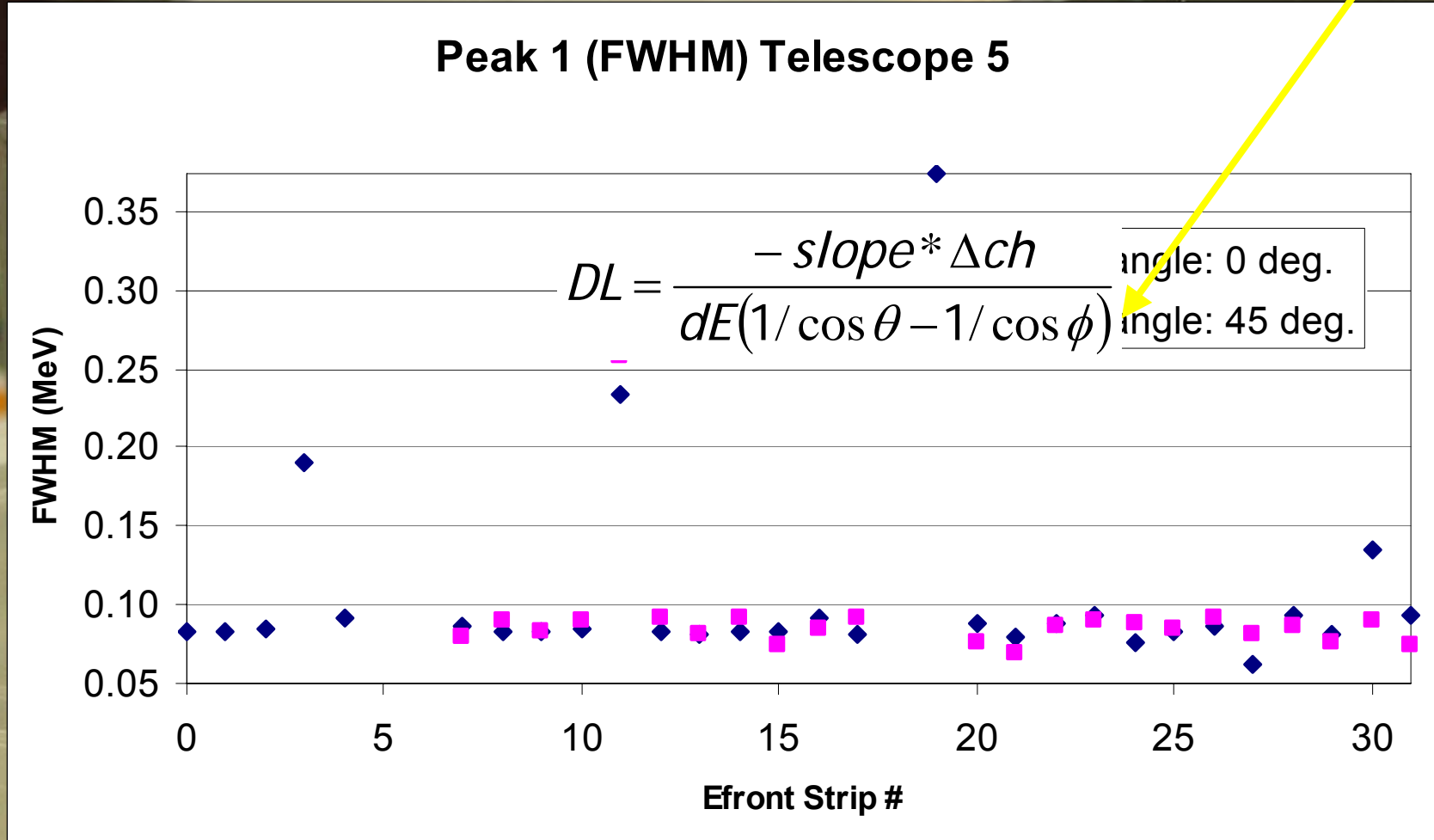
Calculation

- Alphas from different runs travel through different effective thicknesses of dead layer
- This can be detected by a shift in peak position caused by this extra energy loss
- By knowing the angles the alphas come in at, the dead layer can be calculated

$$DL = \frac{-slope * \Delta ch}{dE(1/\cos \theta - 1/\cos \phi)}$$

Limitations

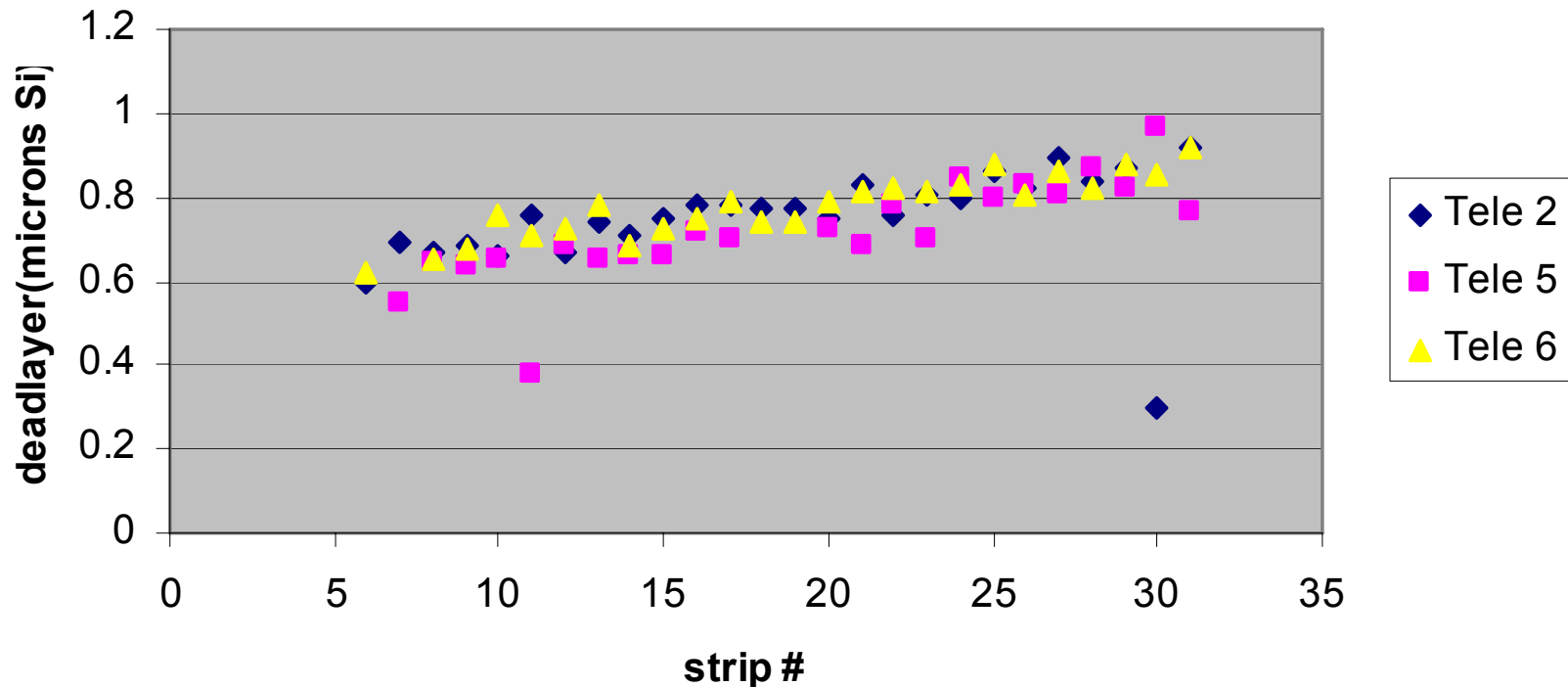
Angle Dependence (large Resolution uncertainty with close angles)



Large Chamber

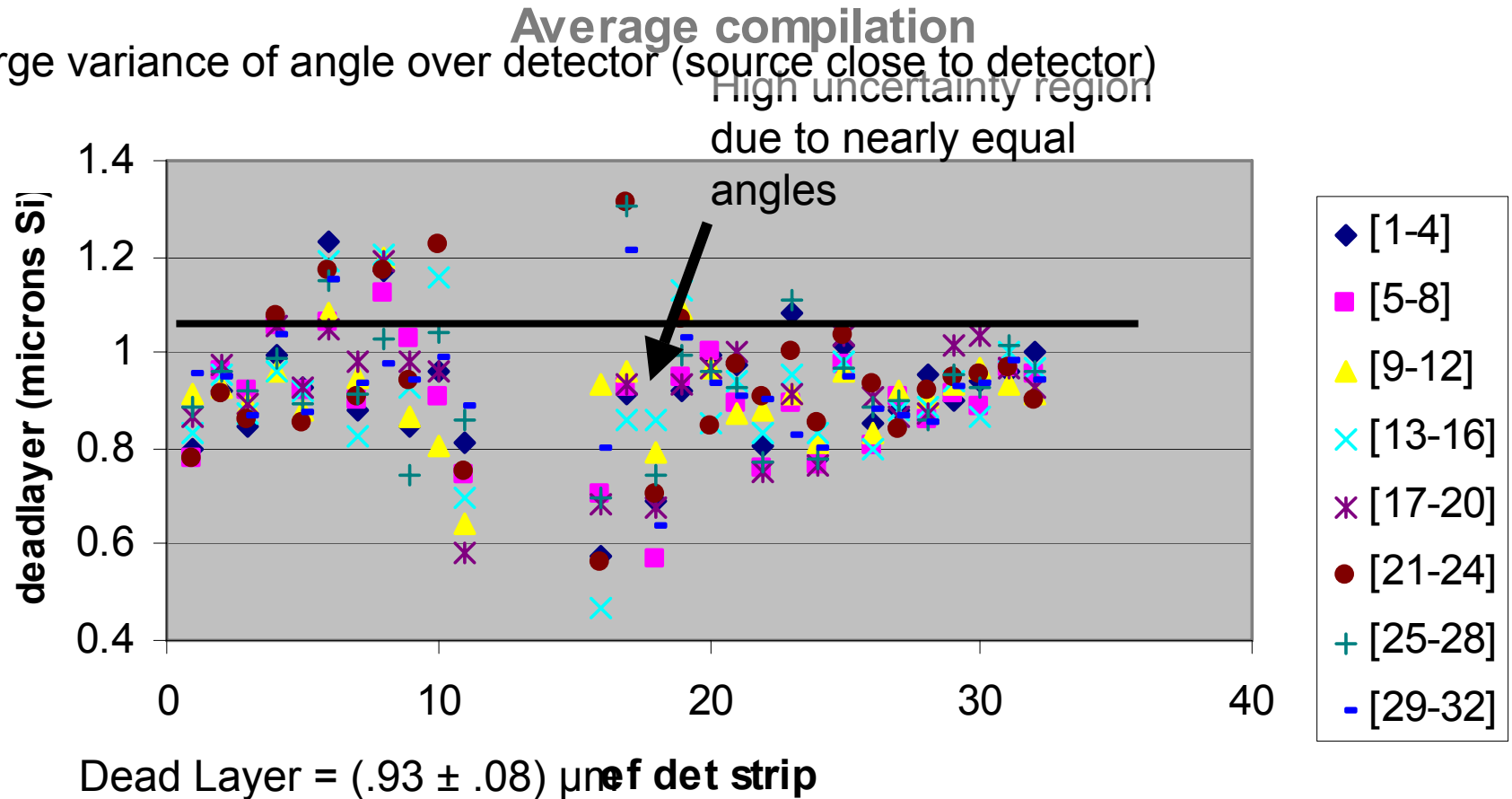
- Changed angle of detector from 0 to 45
- Relatively large distance separating source and detector

Telescopes 2,5,6 Run 361-362 Comparison



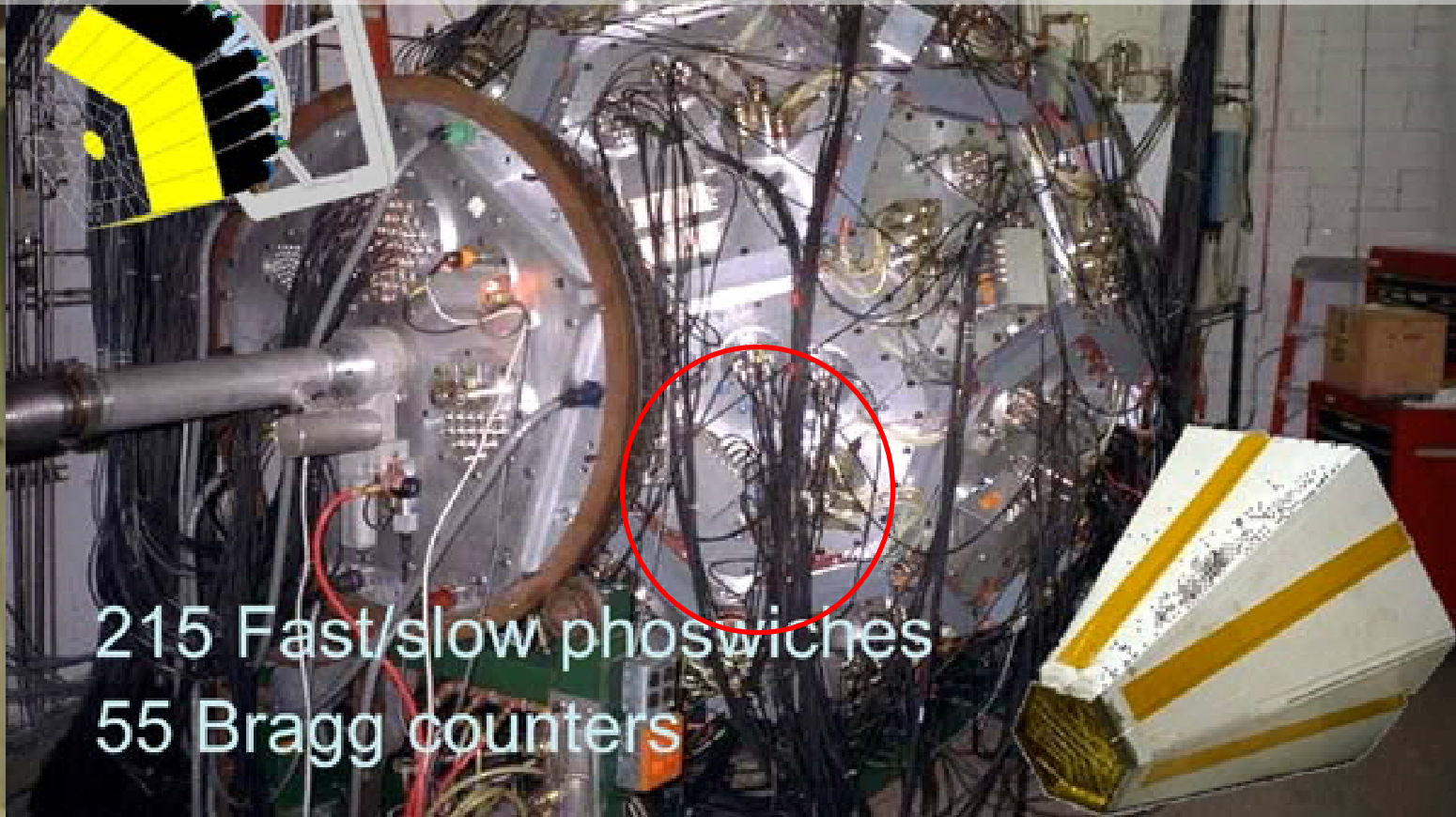
Telescope 1 trails

- Small Chamber Used
- Source at .1 and 8.7 cm
- Detector between 1.7 and 8.1 cm
- Large variance of angle over detector (source close to detector)



Future Plans

- Investigate and reduce uncertainties
- Use hira in conjunction with 4π in Nov. 2006



Acknowledgements



- Prof. Betty Tsang
- Vladimir Henzl
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- NSCL