

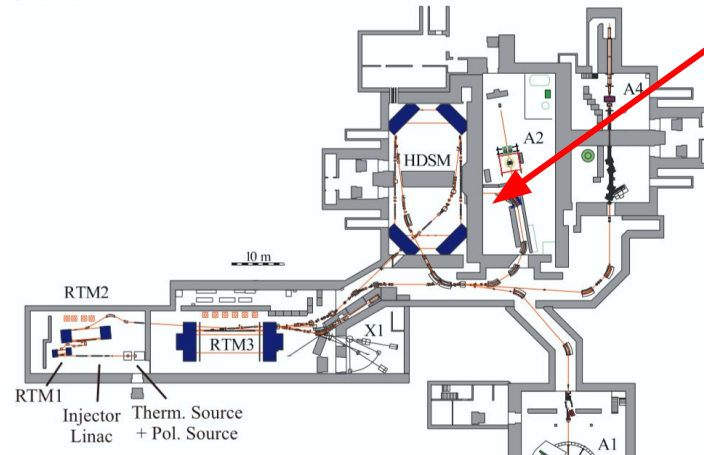
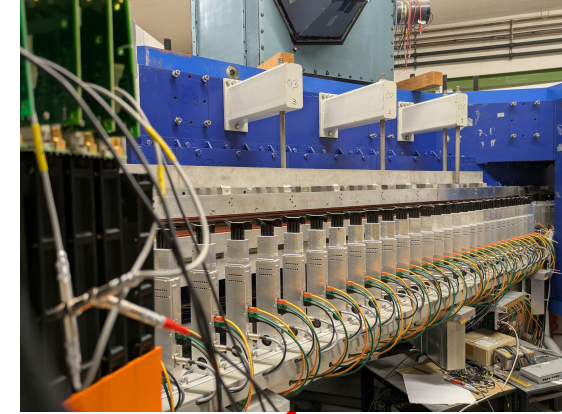
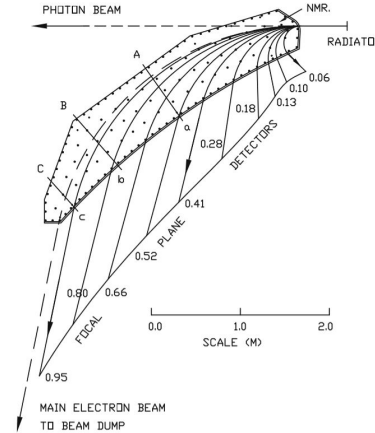
Parasitic Testing in the A2 Hall at MAMI

Luminosity Group Meeting 07/08/25

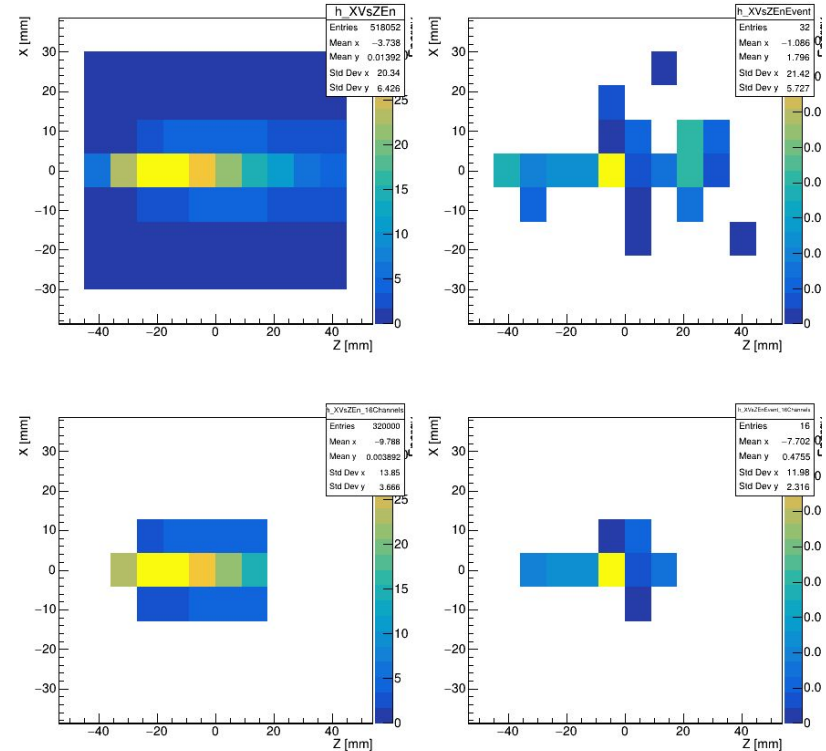
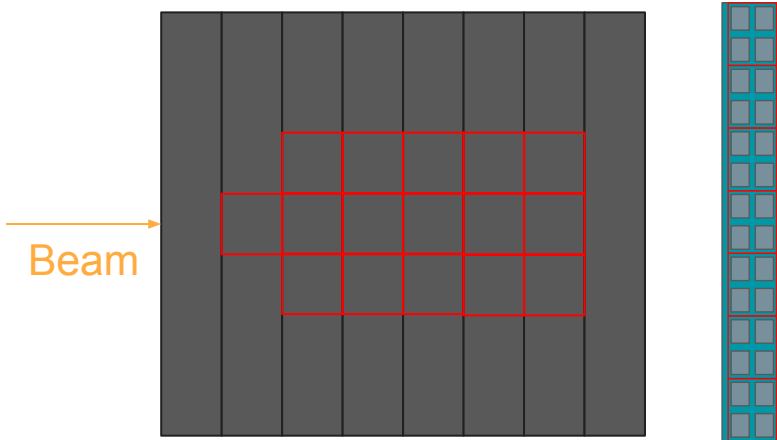
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Setup

- Modules were placed in the electron tagger at the A2 hall in Mainz.
- Placement of the modules allowed for choice of electron energies (275 - 550 MeV).

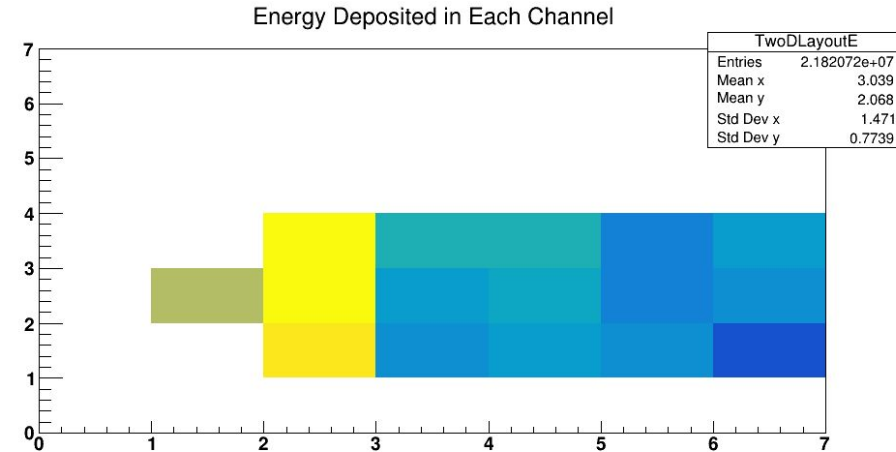
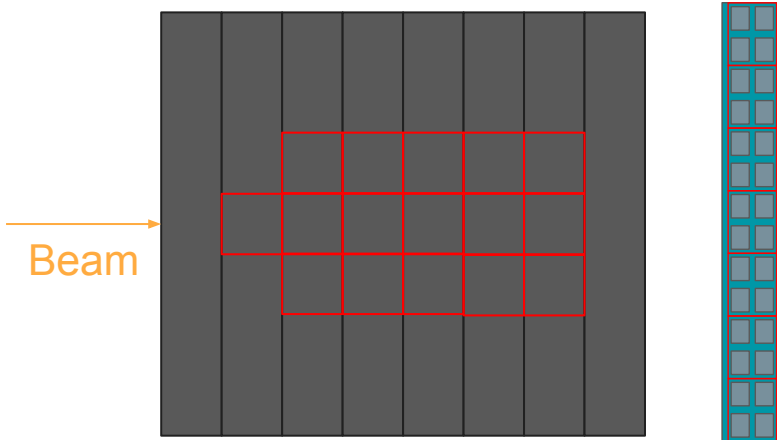


Simulation Studies



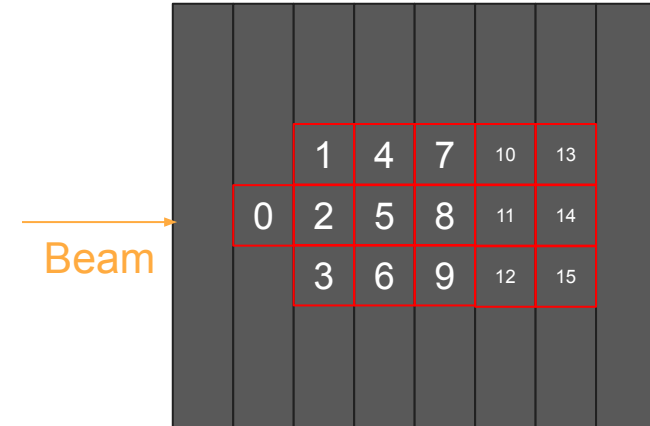
Initial data from Tagger 18

- Tagger 18 saw energies of 410 to 425 MeV



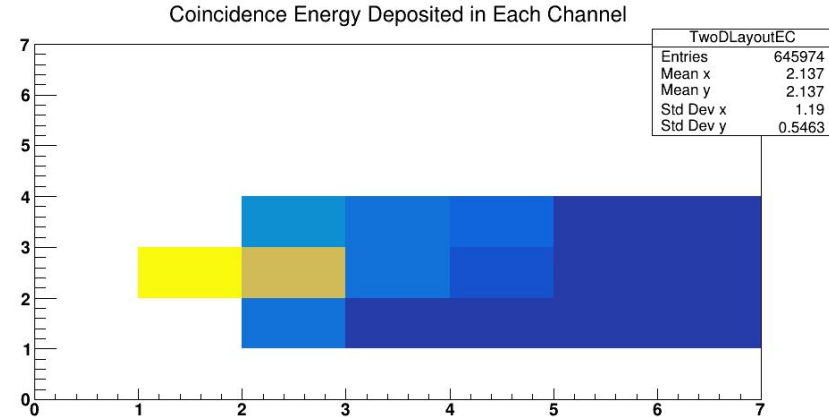
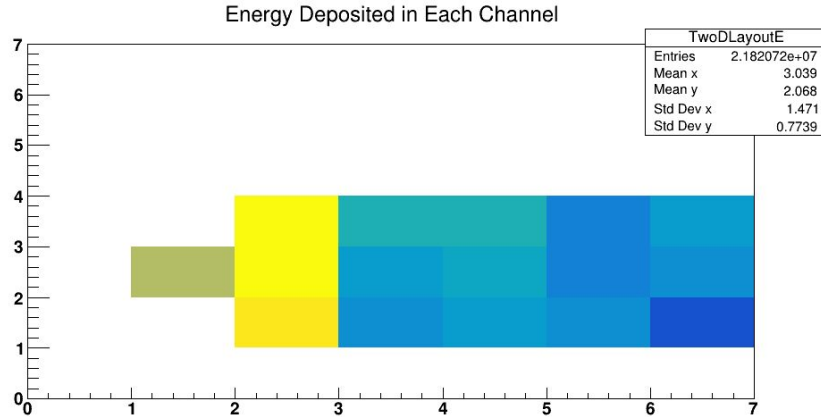
Coincidences

- The following criteria were required for a coincidence:
 - High energy hit in channel 0
 - Also a hit in channel 2
 - A hit in channel 4 or higher
 - All within 25 ns
- Other hits within the time window were also included in that event.



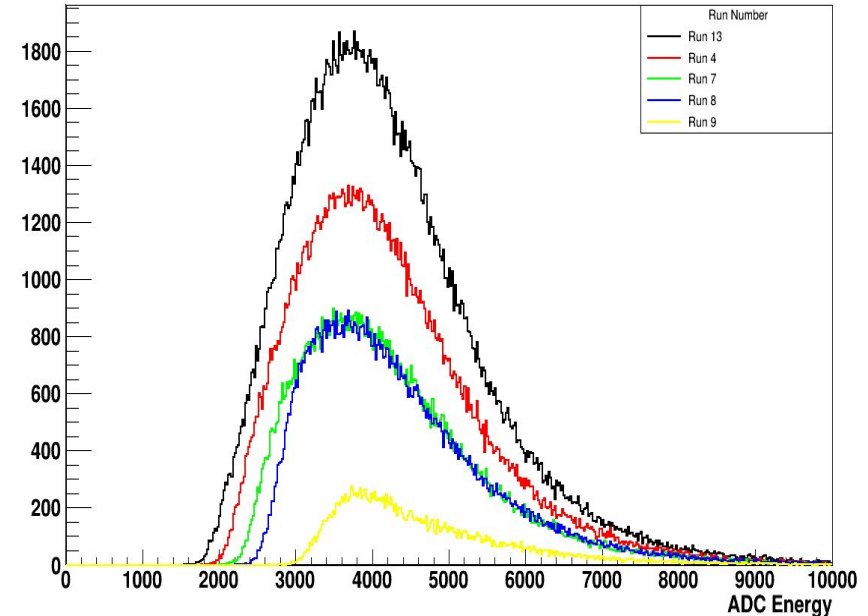
Coincidence events

- After applying the criteria:



Total event energy

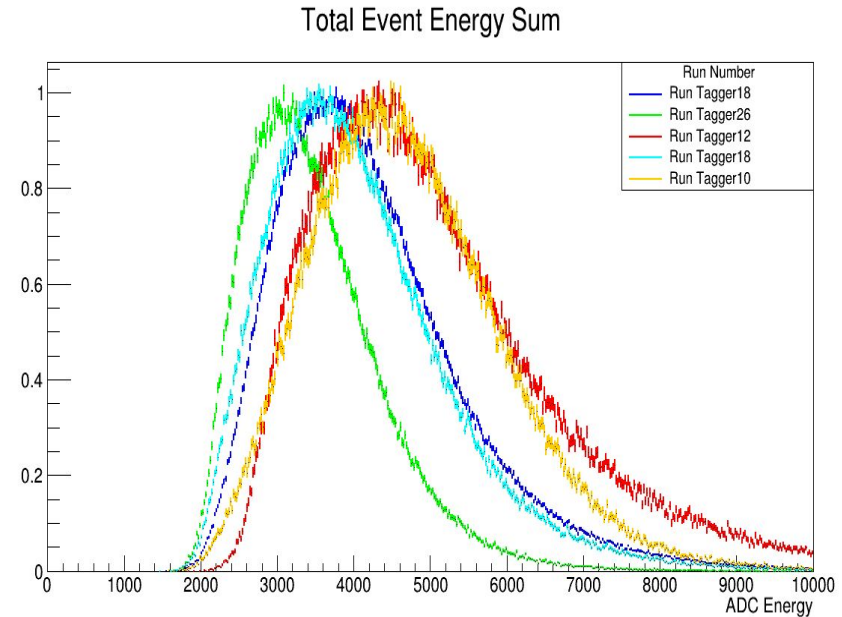
- The total energy of each event was taken as a sum of the energy in each channel that triggered.
- This does not account for gain differences between the channels.
- However as the setup was kept the same at each point the comparison will still be valid.



Position and Total Event Energy



- Compare the peak of this at each position within the tagger.
- Histograms are normalised to the most frequent bin.
- Two runs were taken at tagger 18 - slight positioning difference likely accounts for the difference.



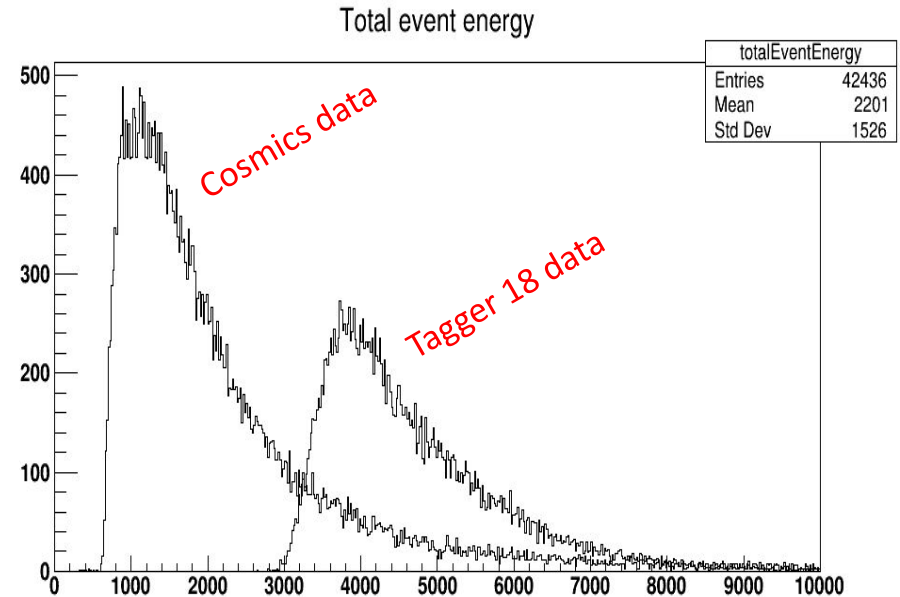
ADC to MeV conversion

Worse alignment?

Tagger	Tagger energy (MeV)	Peak bin (ADC)	ADC per MeV
26	288.5 - 300.6	3100	10.5
18 (1st)	410 - 425	3780	9.1
18 (2nd)	410 - 425	3560	8.5
12	520 - 540	4340	8.2
10	545 - 563.5	4500	8.1

Further Analysis

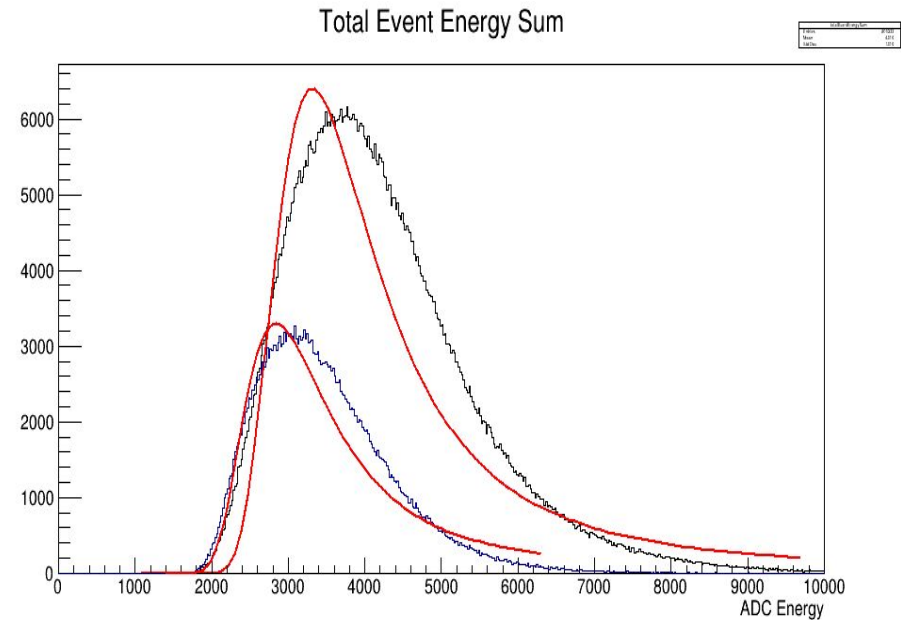
- Take more cosmics data in York for calibration.
- Settle on the best way to determine peak high and shape.
- Evaluate the energy resolution of the detector.



Landau Fitting Total Event Energy



- Can manual find the peak of each histogram by looking for the most populated bin.
- Can also fit a landau.
- Can compare the most probable value of each histogram.



BACKUP

MPV comparison

Tagger	Tagger energy (MeV)	Peak bin (ADC)	Landau MPV (ADC)
26	288.5 - 300.6	3100	2822
18 (1st)	410 - 425	3780	3404
18 (2nd)	410 - 425	3560	3260
12	520 - 540	4340	4084
10	545 - 563.5	4500	3889

BACKUP