

PRad RC Report

(Week of June 6 - 12)

Highlights:

DAQ issues resolved; ran with 15 nA current since Friday @ 15 nA trigger rate ~ 5kHz and 87% live-time.

Largest set of GEM detectors ever built, running at the highest DAQ rate achieved with the SRS system.

Most weekdays beam was restored within 2-4 hours after closing the Hall.

Reached production goal for 1.1 GeV beam on Hydrogen.

(over 500M events collected, about 25-30% are background. Also collected over 50M events with empty target.)

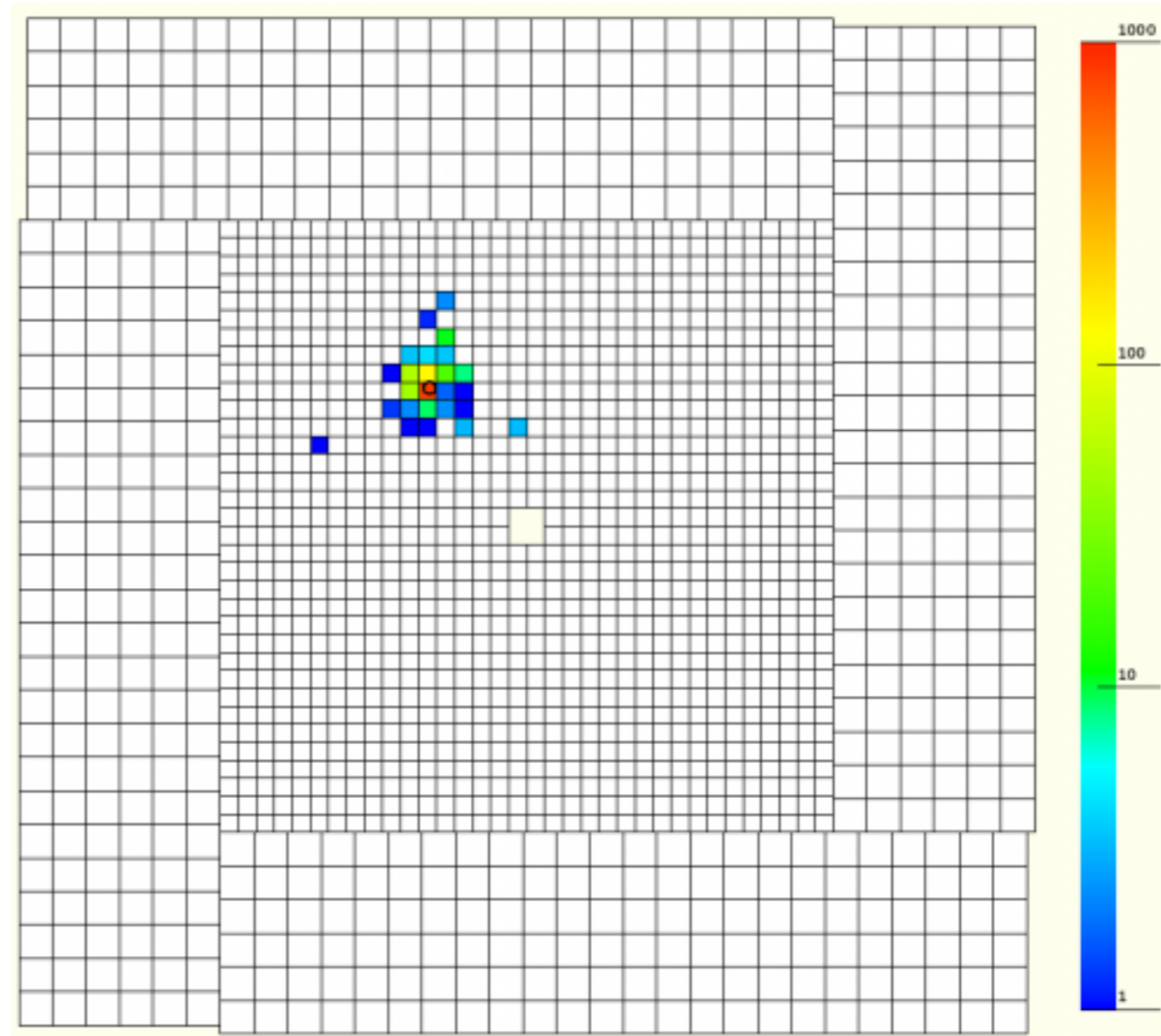
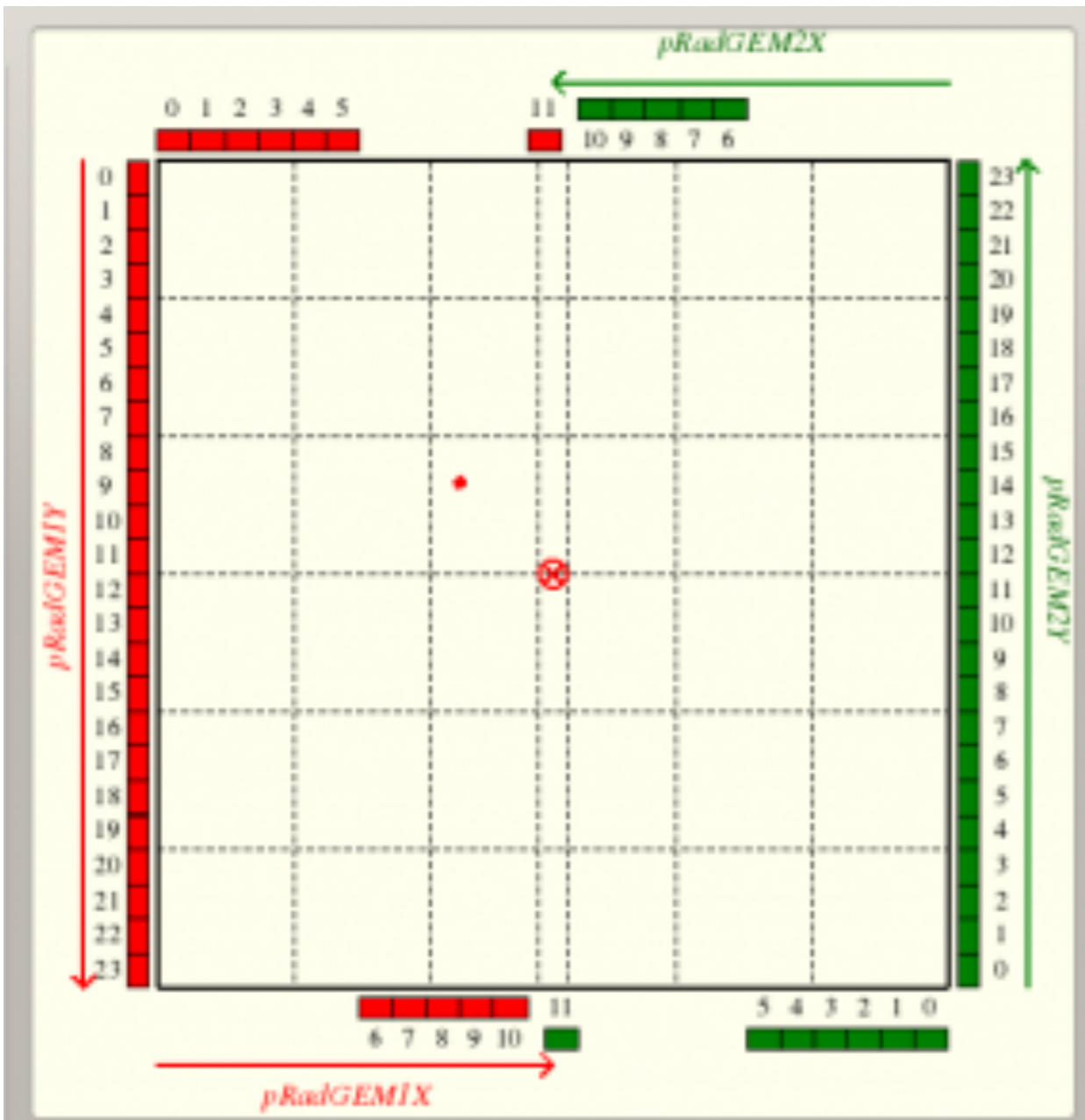
A reference measurement on a 1um thin Carbon target will be completed tonight.

Asking to switch to 2 pass beam on Monday.

Online matching between GEM and HyCal hits

GEM

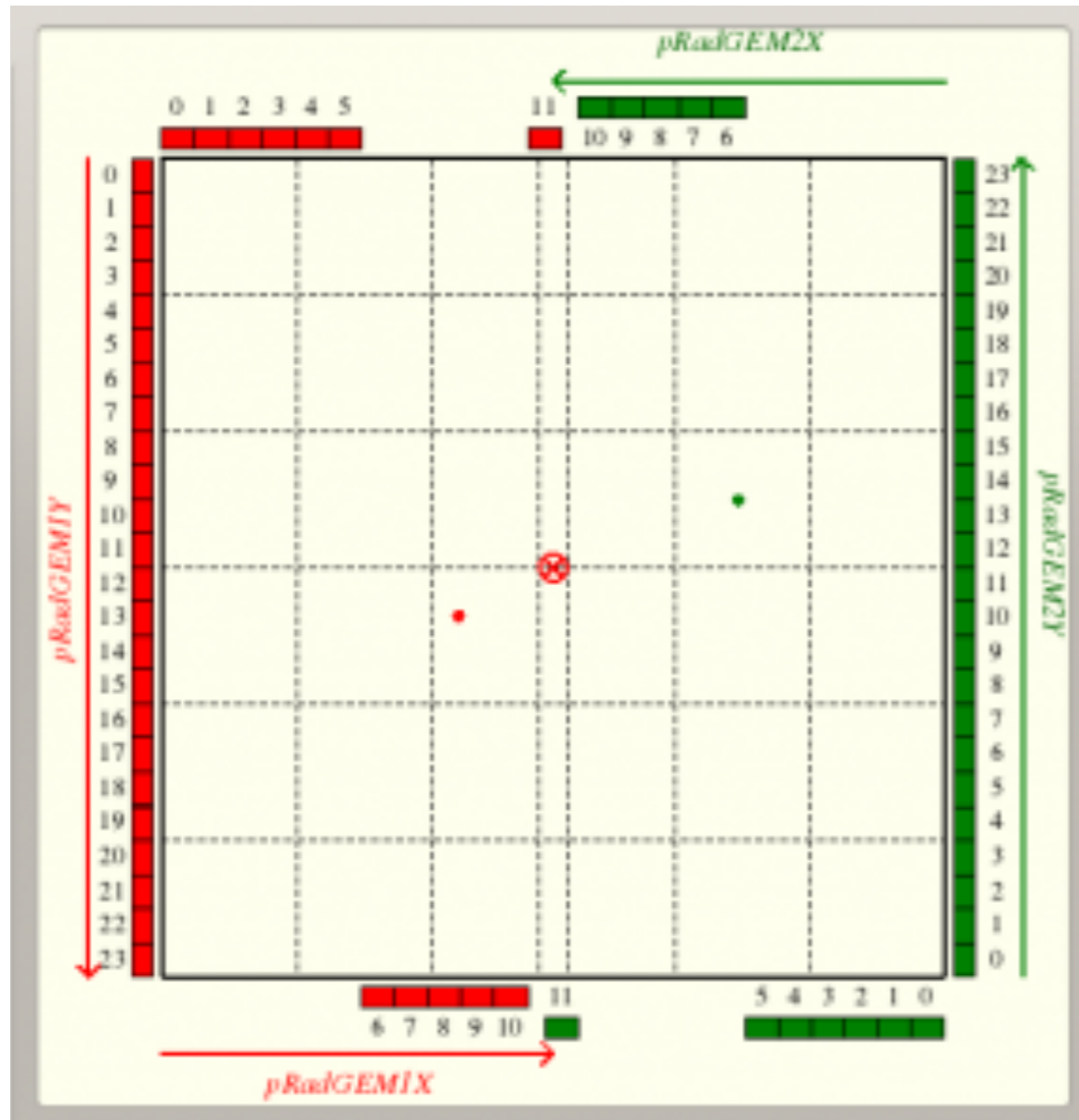
HyCal



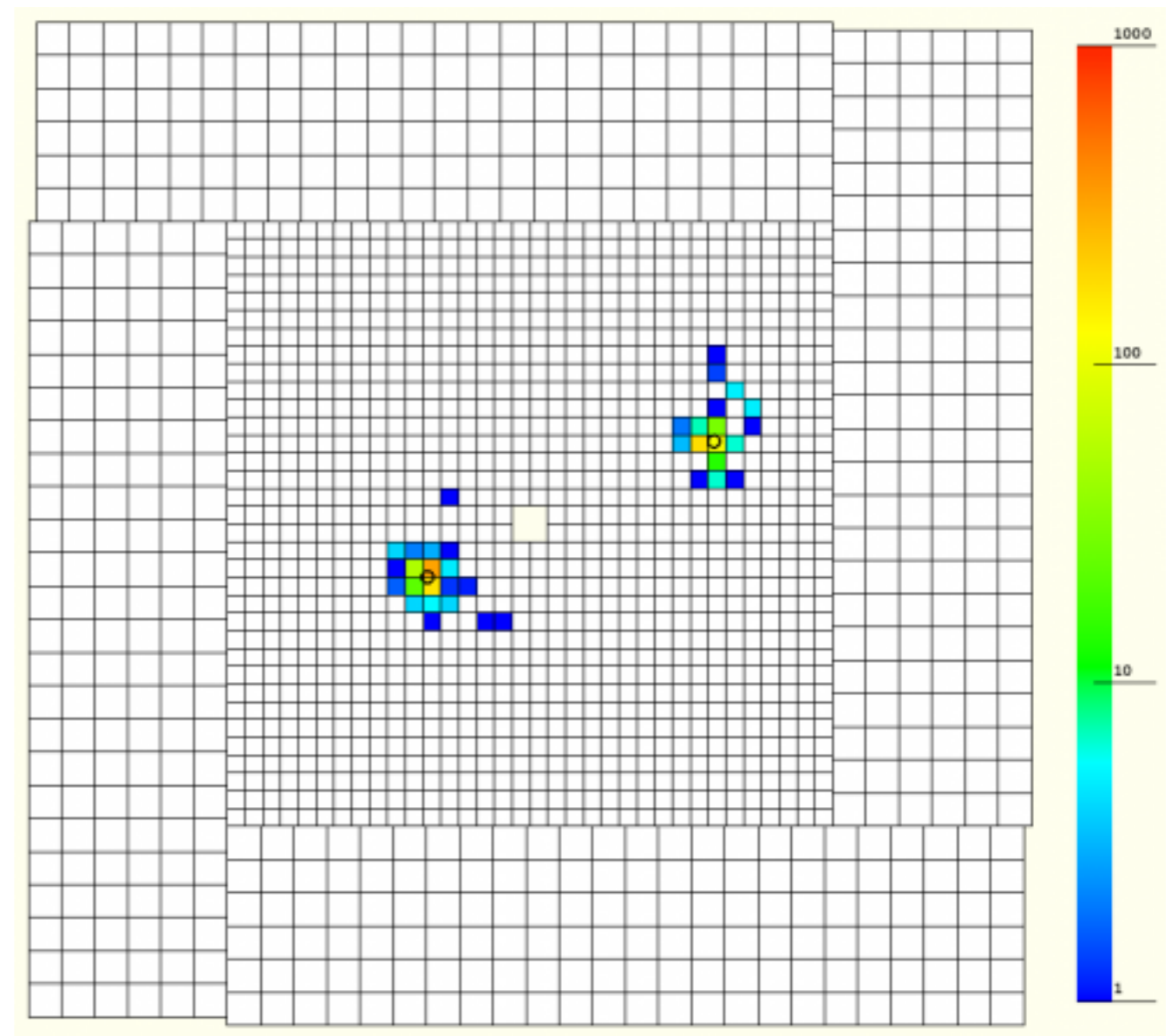
An e-p elastic scattering event

Online matching between GEM and HyCal hits

GEM

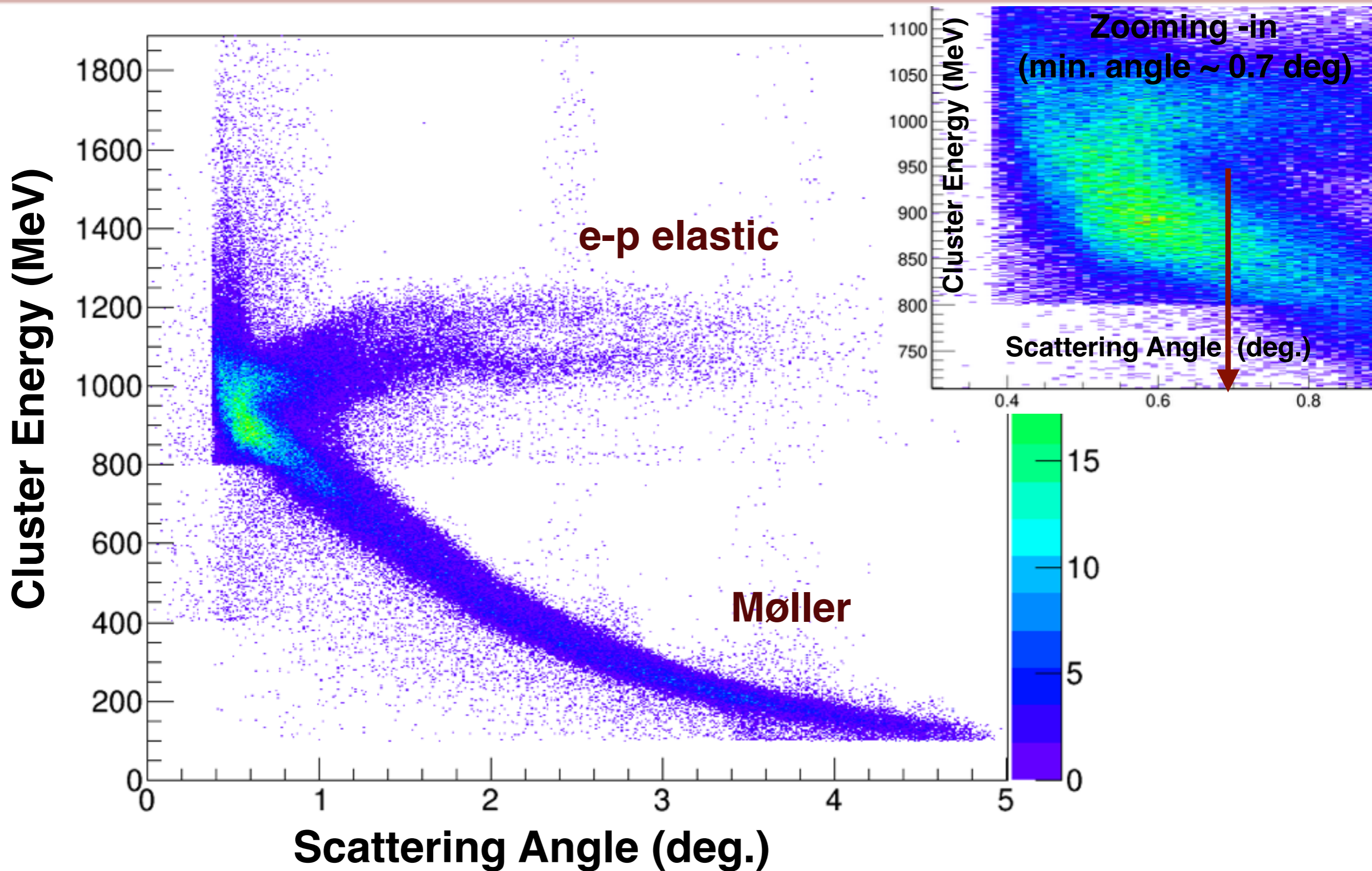


HyCal

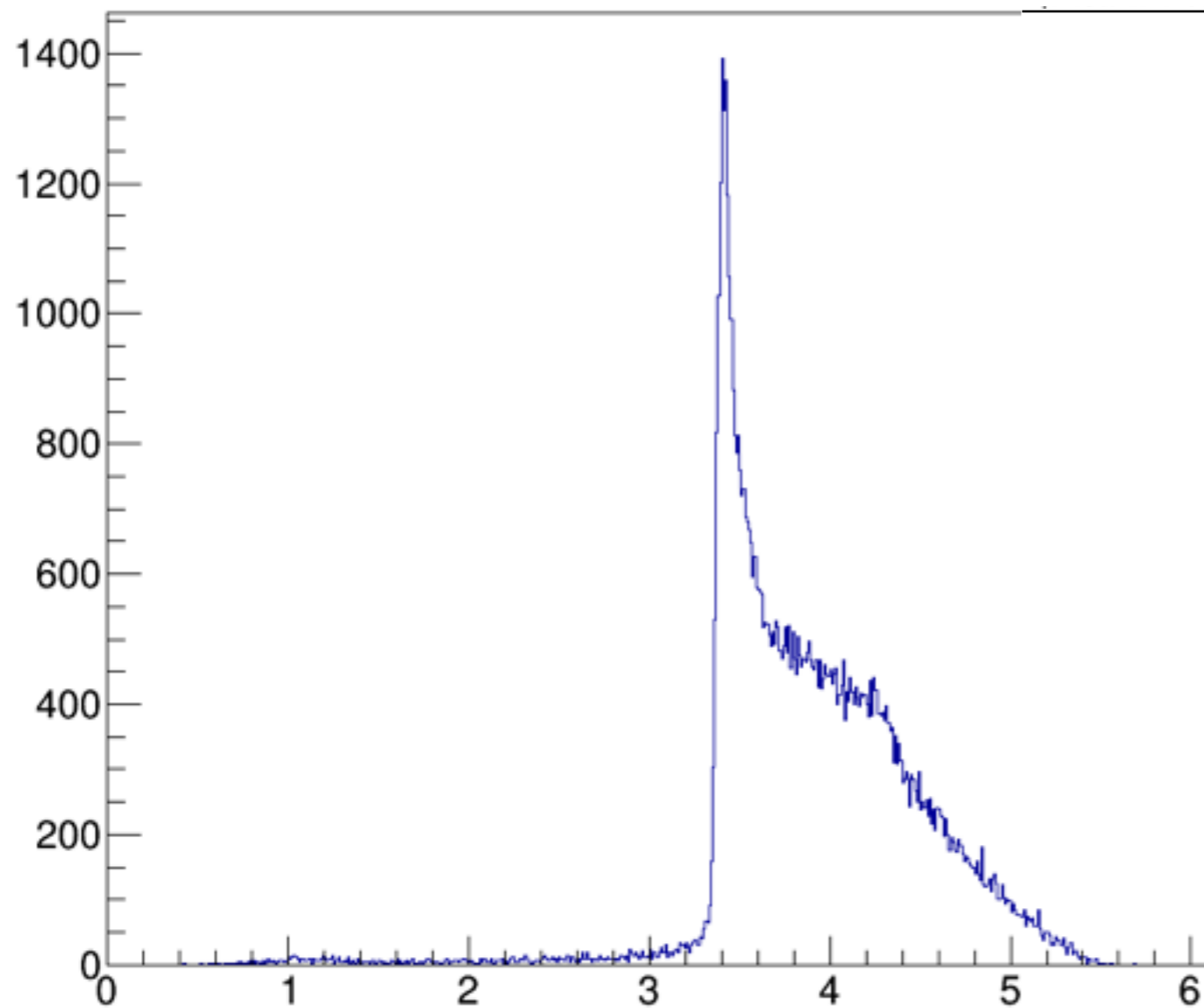


A Møller scattering event

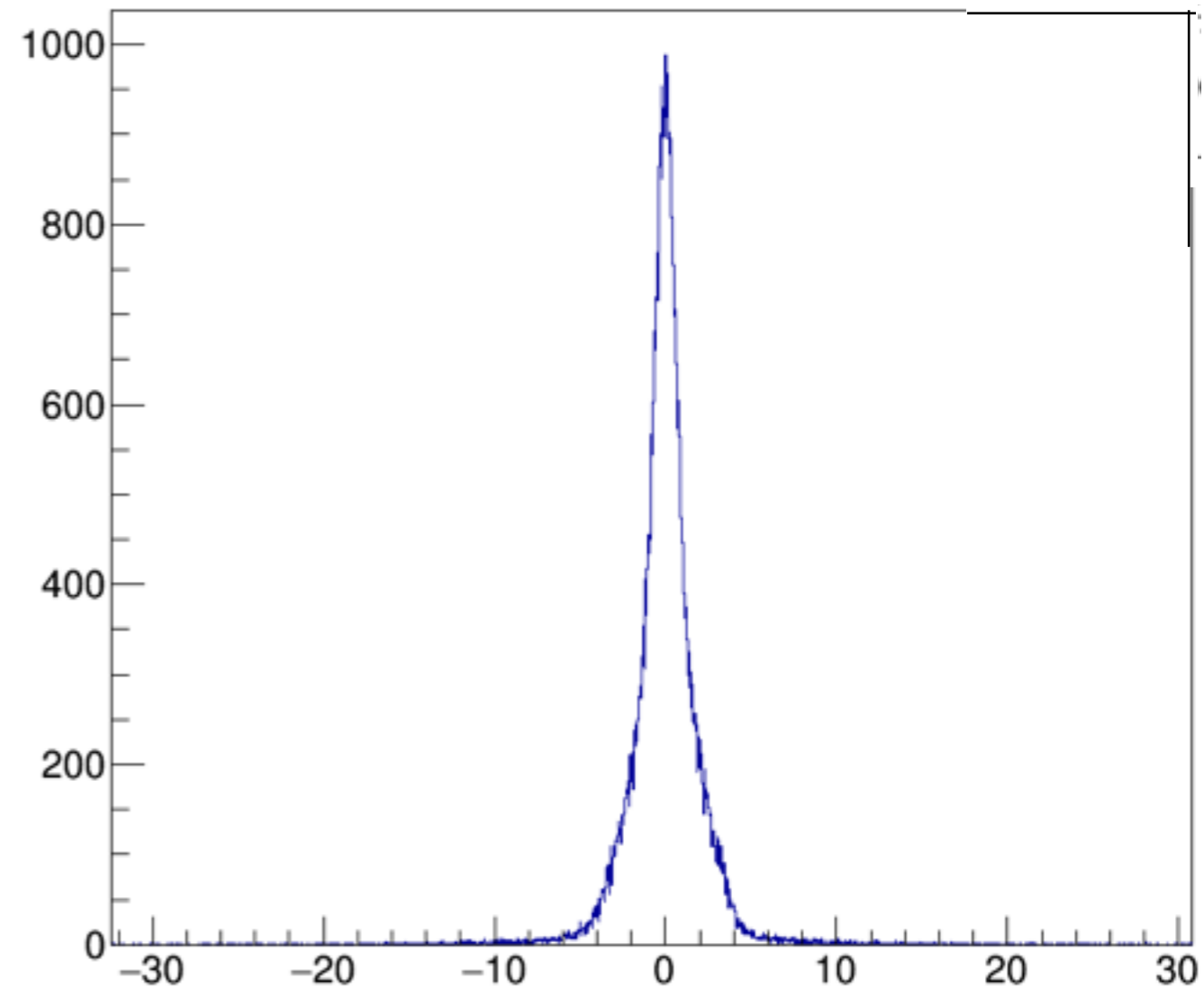
Energy vs scattering angle with preliminary calibration



Møller opening angle and coplanarity



Møller opening angle (deg)

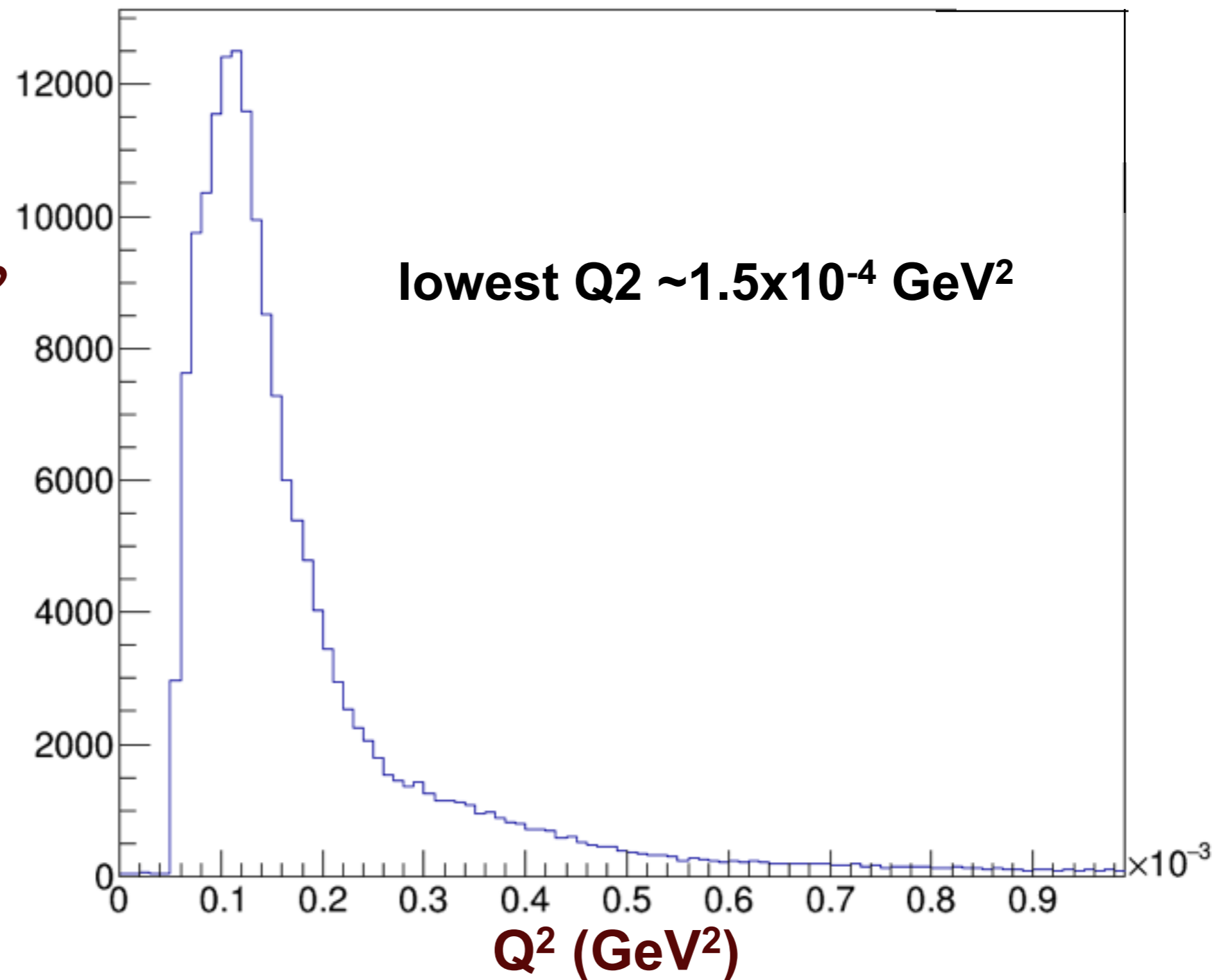


Møller $\Delta\phi$ (deg)

Preliminary matching of GEM hits with HyCal clusters (PbWO₄ only)
Total energy of two clusters > 700 MeV

Q^2 distribution of e-p elastic events

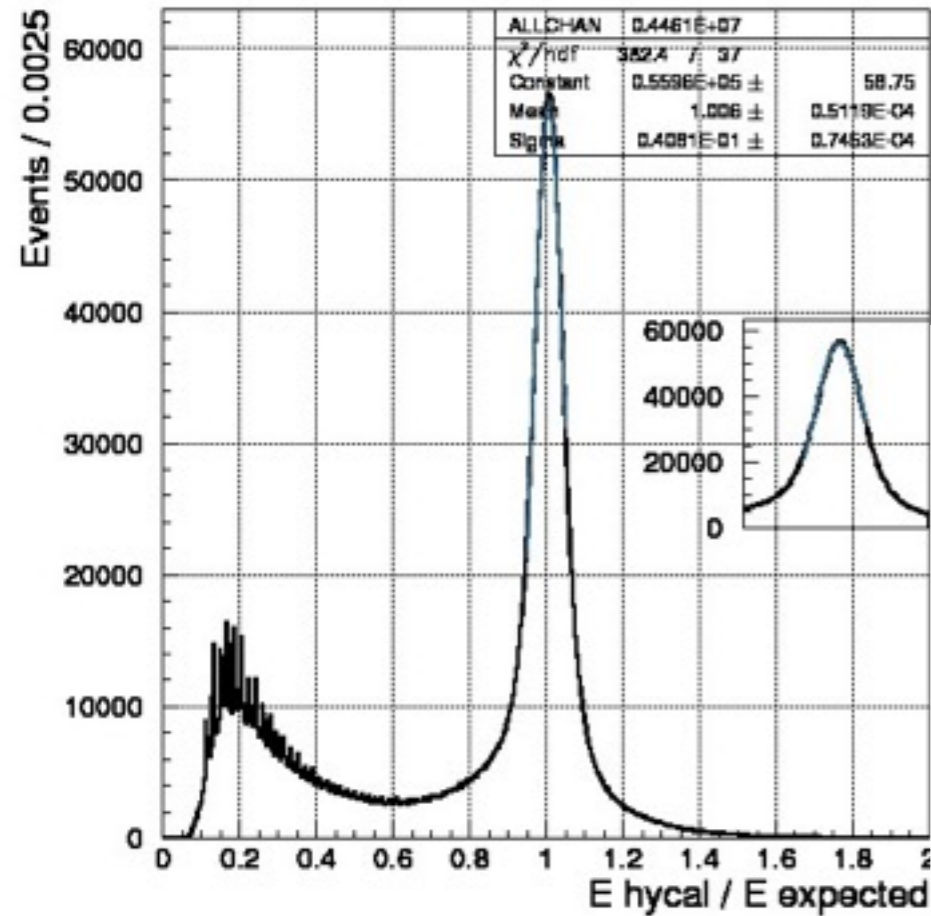
**Achieved the lowest Q^2 in
e-p scattering experiments**



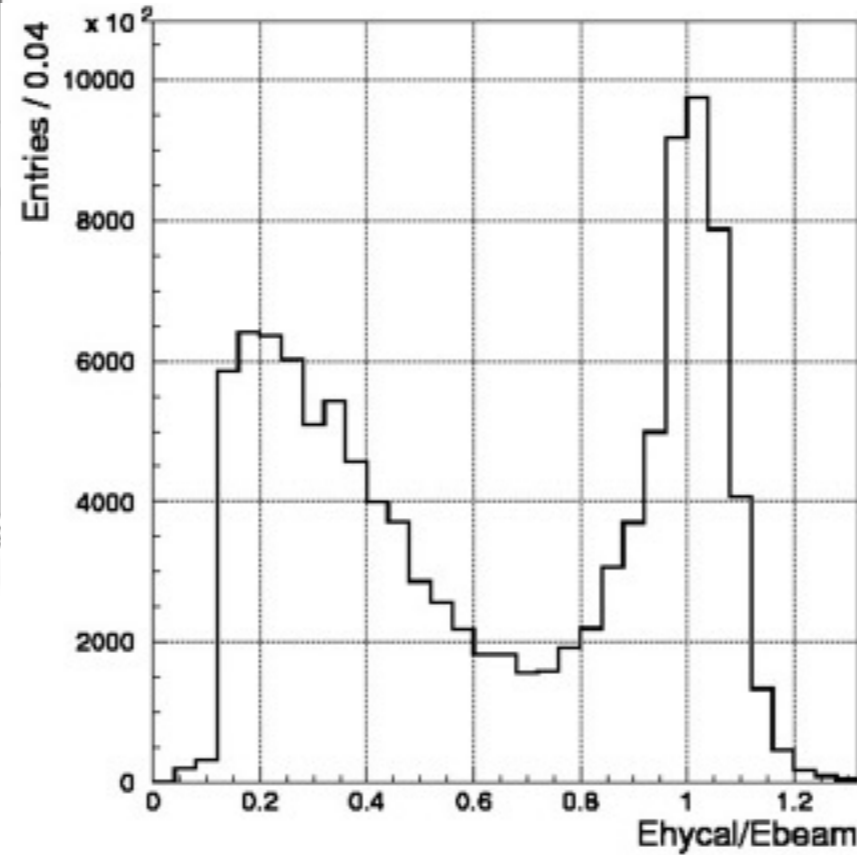
Preliminary matching of GEM hits with HyCal clusters (PbWO₄ only)
Total energy of cluster > 700 MeV

Calibration of HyCal is underway

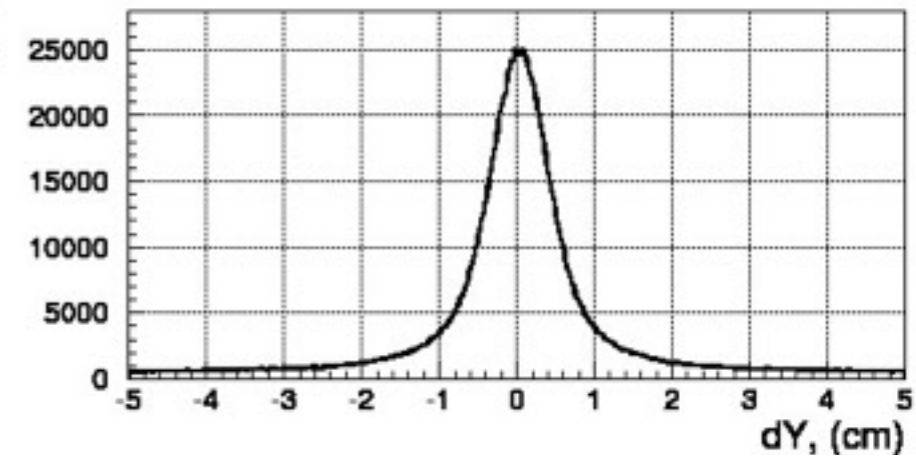
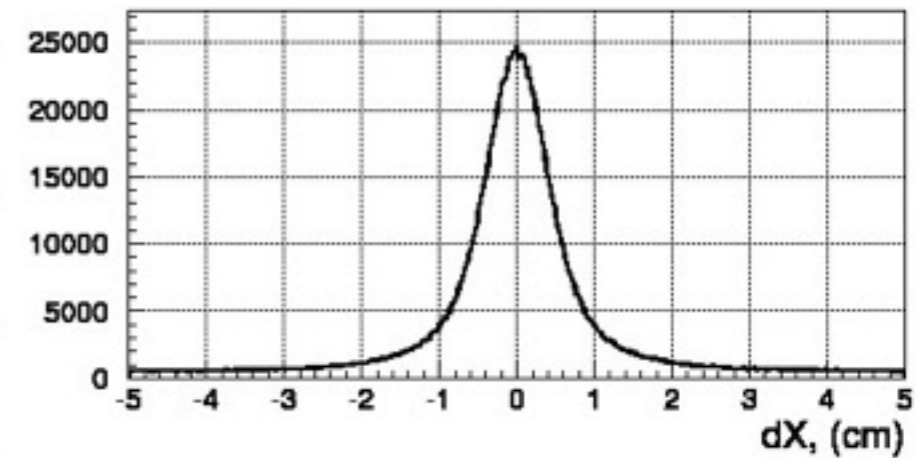
Møller Energy



ep elastic energy



position



Plans for the next week

Collect 2.2 GeV data to extend the range of Q^2

The full Q^2 range is essential for robust extraction of proton charge radius (i.e. 2.2 GeV data just as important as the 1.1 GeV data)

Need total of 96 hrs (4 PAC days) of running to get the full statistics (including the empty target running).