High Rate/Low-Q2 Tracker – Build in Calibration

- Timepix4 ASIC has per-pixel threshold adjustment through internal charge injection circuitry.
  - Periodic checks/recalibration should be carried out.
  - A small fraction of pixel may be noisy, these can be masked away.
- Depending on running conditions regions with extremely high rates/channel can will be switched off.
- Detectors will be movable in and out of the beam horizontal plane to avoid unnecessary radiation when the beam is being tuned.
- Additional alignment in the horizontal direction to calibrate energy acceptance and rate tolerances.
  - Average profile of the scattered electrons across the tagger layers will provide global alignment
  - Individual tracks will build up picture of any small misalignments between sensors and layers.
- As/when the beam magnet fields are changed, new calibrations will be needed but could be mitigated by including specific beamline data in our readout.
- Overall energy calibration needs to be done in combination with the luminosity systems.
  - Sum of the energy detected in coincidence between the pair spectrometer and tagger recovers the beam energy.
  - Bethe-Heitler cross section well understood so that if the luminosity is measured, the energy can be reconstructed from the flux across a region of the detector.
  - Kinematic peak in photoproduction spectrum

TIC – 5th Feb 2024