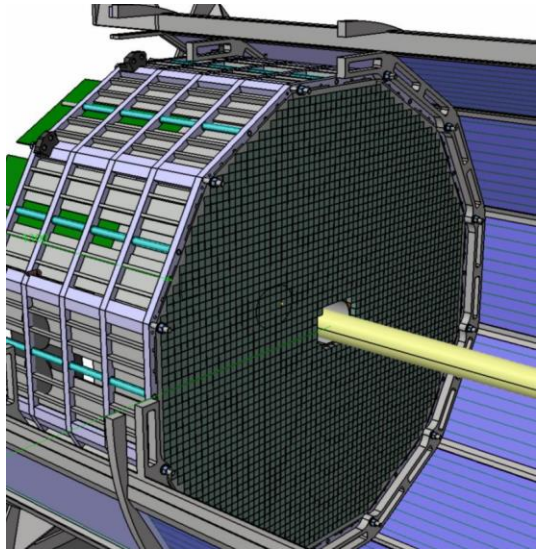
Backward ECal calibration plans

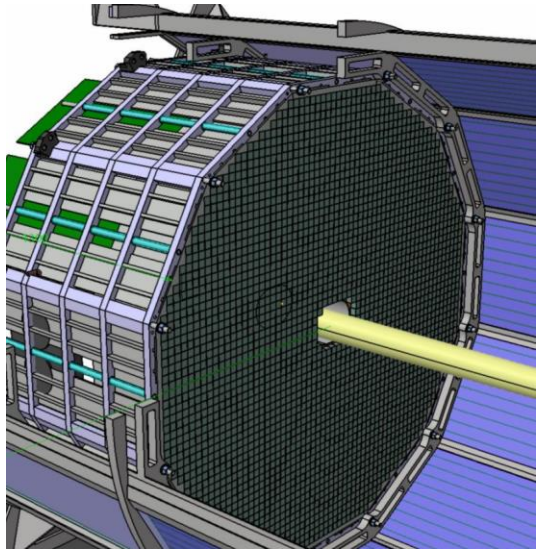


- **Cosmic rays:**
  - Preliminary calibration and gain balance of each channel
  - Done pre-installation, and opportunistically during running period

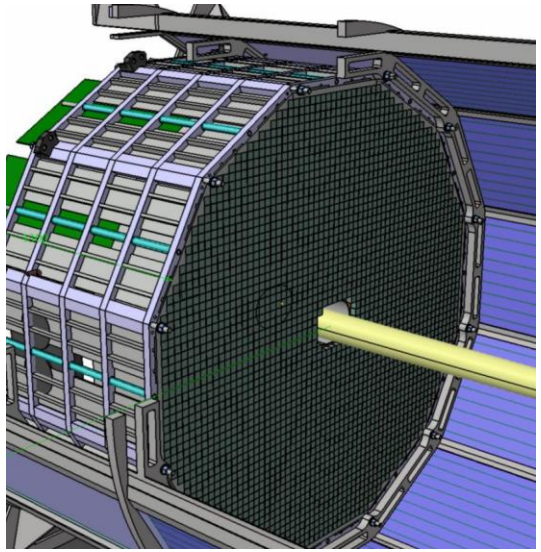
- **Gain monitoring** (light pulses into crystals):
  - Preliminary calibration and gain balance of each channel
  - Periodic injection of light pulses into crystals concurrently with production data (at a rate of a few Hz)

- **“Physics” calibration:**
  - Neutral pions (invariant mass position and width)
  - Electrons (using information from the tracker)
  - MIP

Backward ECal calibration needs

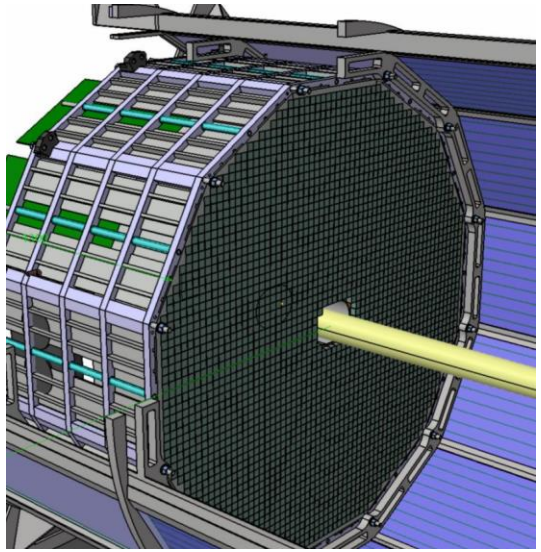


	Cosmics	Gain monitory	« Physics » calibration
External data needed?	No	No	π^0: No e-: tracker MIP: tracker
Specific beam conditions needed?	No beam	No	No
Need other detectors to be calibrated?	No	No	π^0: No e-: tracker MIP: tracker
Time scales needed?	Opportunistically (when beam off)	Concurrently with production data (~Hz rate)	Every 1-2 days
How much data needed?	~8h (10k events)	~1h (300k events)	~1 day of production data (depends on luminosity)
Human intervention needed?	Likely not	Likely not	At first, likely not later
If intervention needed, can the SRO group help?	Yes	Yes	Yes
Where are calibration results applied?	During reconstruction (if «physics» calibration not yet available)	Not applied; only monitoring	During reconstruction
Is external storage/DBs needed?	Yes (DB)	Yes (DB)	Yes (DB)
Do multiple calibrations for same running period need to be stored?	Yes	Yes	Yes



Back up

ePIC EMCal Calibration



"Usually" a few hundred particles per tower needed

Depends on resolution, gain alignment, background, other syst. effects

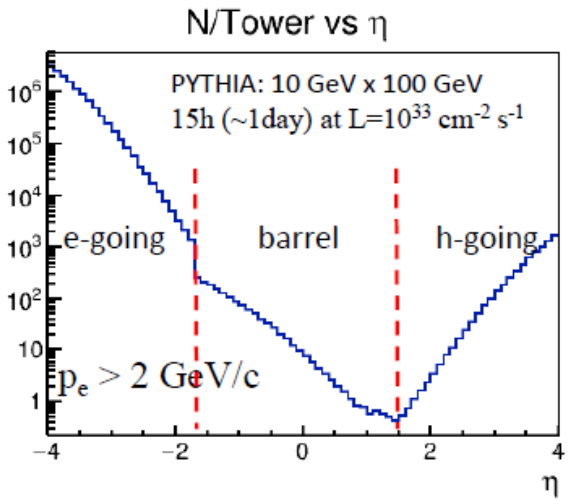
Granularity:

Backward: 2x2 cm²

Barrel: 2x2 cm²

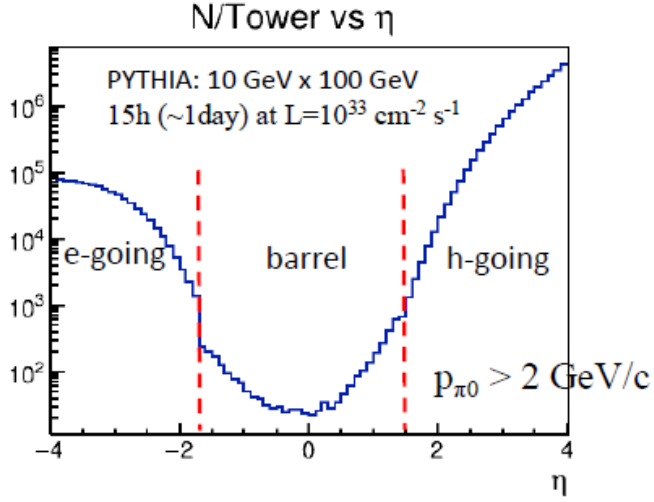
Forward: 2.5x2.5 cm²

Electron



1-day statistics is enough for e-endcap and the most forward h-endcap

$\pi 0 \rightarrow \gamma\gamma$



1-day statistics looks enough for endcaps

From A. Bazilevsky (2/26/2024)