

COSY Beamtime 1 – Data Analysis

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First Steps towards Pion-Peak

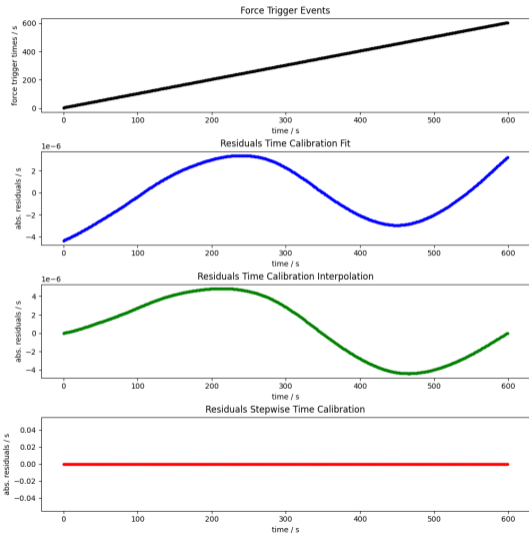
General Plan:

- time calibration based on force trigger events
- energy calibration based on MIP peak
- extract features and apply calibration
→ export file with calibrated hit information
- apply Ben's clustering script
- pion peak

Issues after Testbeamtime:

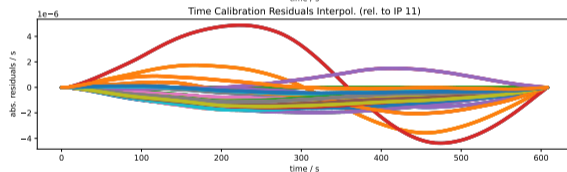
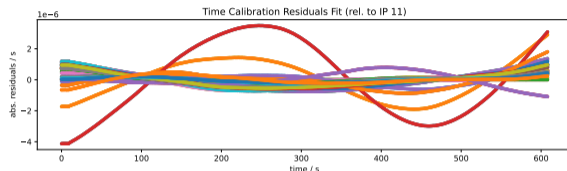
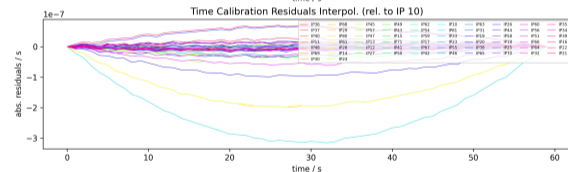
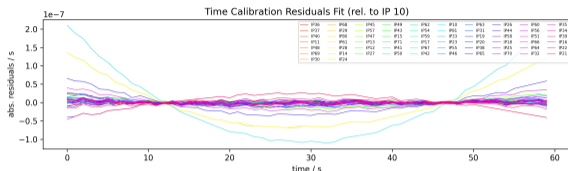
- event reconstruction time cut causing incomplete cosmic tracks
→ time resolution not sufficient?
⇒ [addressed in the following](#)
- general questions how to deal with data analysis...

Time Calibration using Force Trigger Events



- plot trigger time of force trigger events against reference IP (10)
- perform time calibration by linear fit/interpolation
 - 1** linear fit
 - 2** linear interpolation between first and last force trigger
 - 3** linear interpolation between each force trigger individually

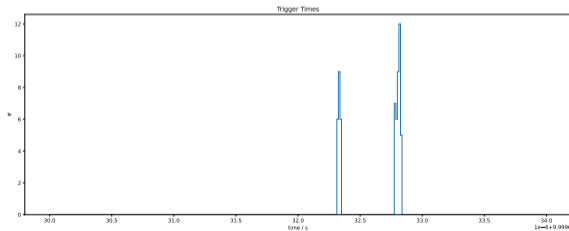
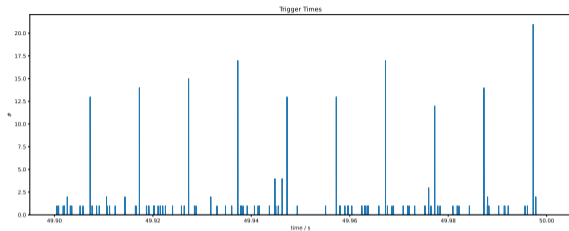
Time Calibration using Force Trigger Events



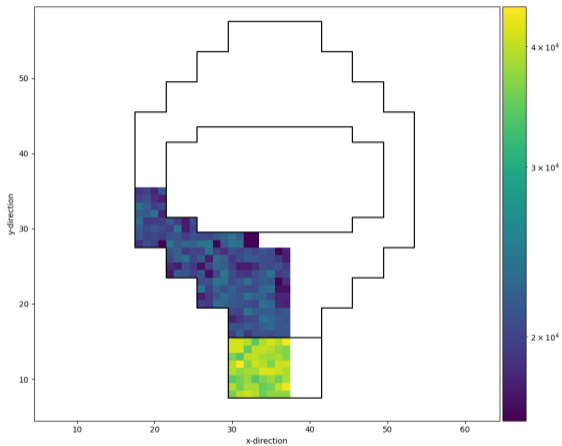
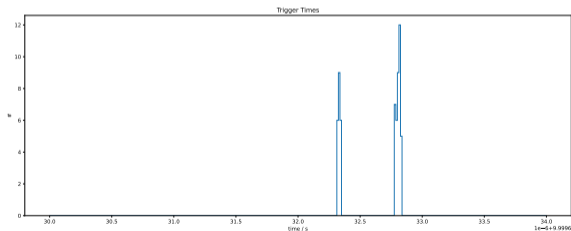
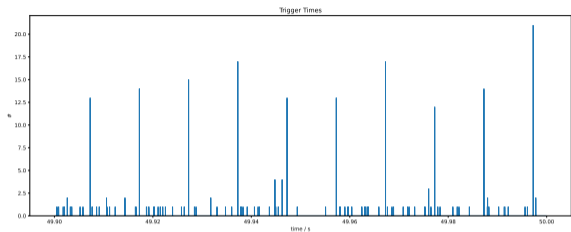
→ clocks are drifting non-linearly

⇒ need stepwise time calibration (linear interpolation between two force trigger events instead of global linear fit)

Step-wise Time Calibration

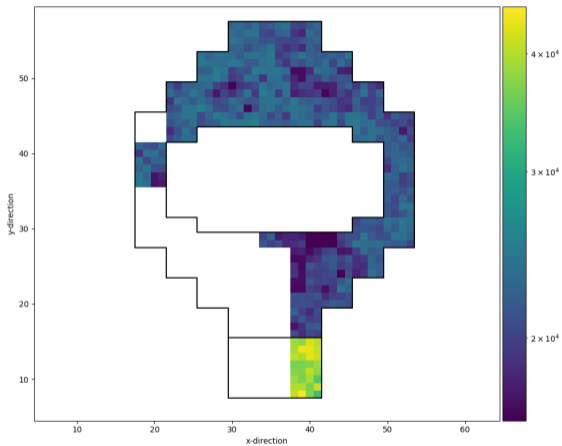
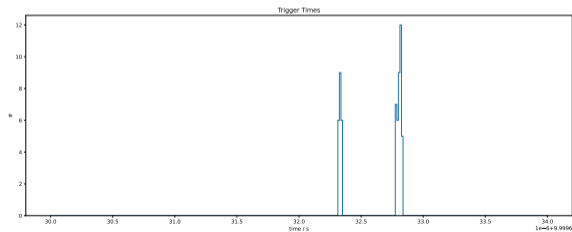
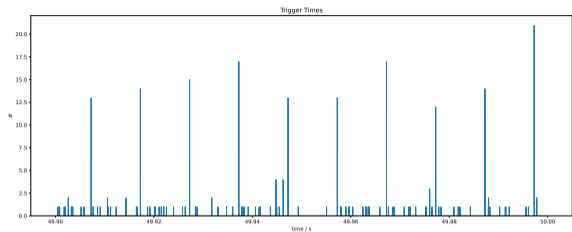


Step-wise Time Calibration



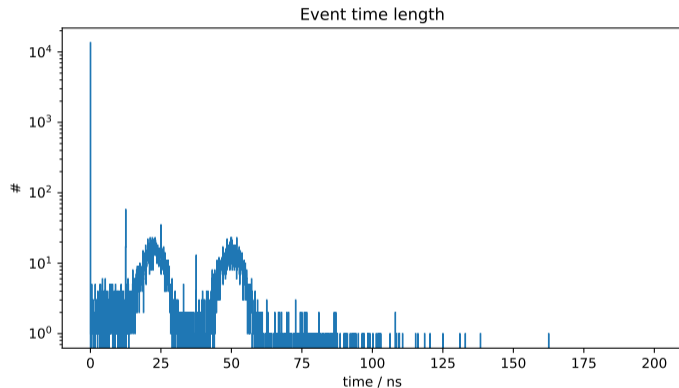
→ LP of quadrant 4 not synchronous with remaining LPs

Step-wise Time Calibration



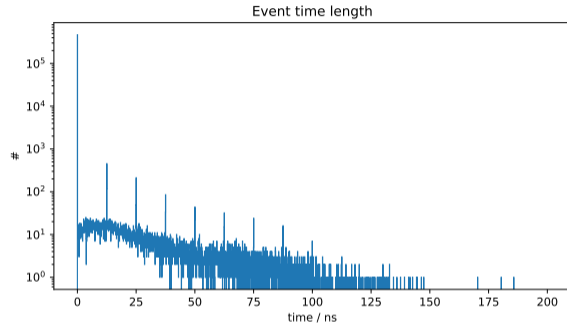
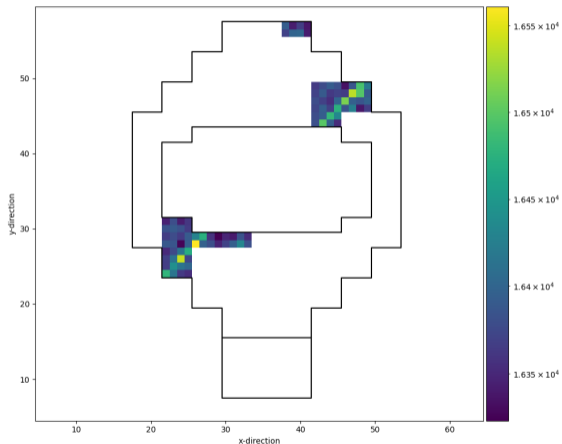
→ LP of quadrant 4 not synchronous with remaining LPs

Event Length for LP-Events



- time difference between first and last entry of one reconstructed event
- event length of 0 s from cosmic events where only one FPGA saw a hit
- two peak from the two classes of LP events
- time cut of $0.1 \mu\text{s}$
→ some events still longer

Results for Cosmic Run



→ time cut of $0.1 \mu\text{s}$ working reliably using stepwise time calibration