Olympus Test Experiment

Status report

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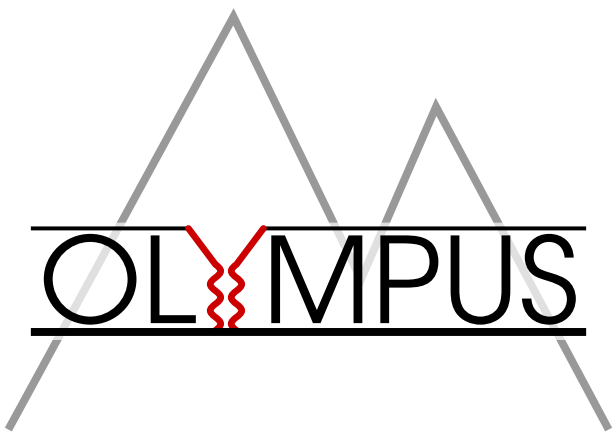

What we have done

- Operated the target system with gas and beam
- Optimized and operated all detectors
- Run with electrons and positrons at 2.0 GeV
- Looked for count rates
- Took data of elastic events

DORIS operation

February

- Bake out at 4.4 GeV positrons (during the night)
- Electron and positron beams of 2.0 GeV (limited to $\lesssim$ 75 mA)
- Injection flashes happened sometimes
- Large day to day variations in beam stability

$\rightarrow$ Good start, but need some further investigations

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April

- DORIS feedback system optimization $\rightarrow$ I $\approx$ 92 mA
- No target installed $\rightarrow$ low count rates
- MWPCs worked fine. GEMs show large pickup

Target and Vacuum

- Vacuum fine with 6 turbos
  - without gas 10^{-9} torr
  - with 0.4 sccm flow 10^{-6} torr
  - with 1 sccm flow $3{\cdot}10^{-6}$ torr
  - recovery time approx. 15 minutes
- Life time behaves as expected with gas flow
- Heat load of cell much more than expected $\rightarrow$ Disassembly
- Installation of more T sensors (up to RT)
- Redesign of target cell and wake field suppressors

Test experiment setup

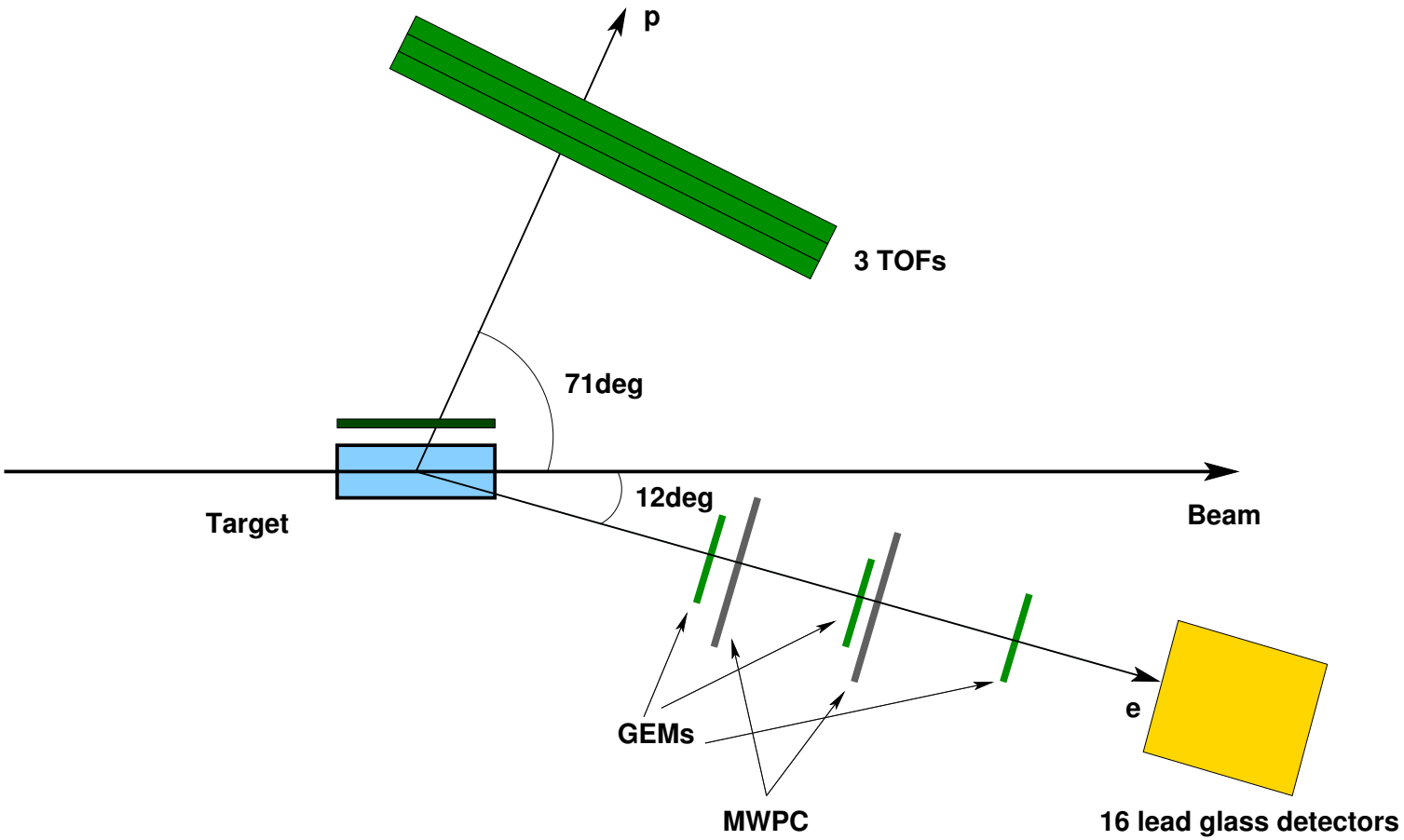


Photo of OTE

Countrates

2.0 GeV, 70 mA, e^+

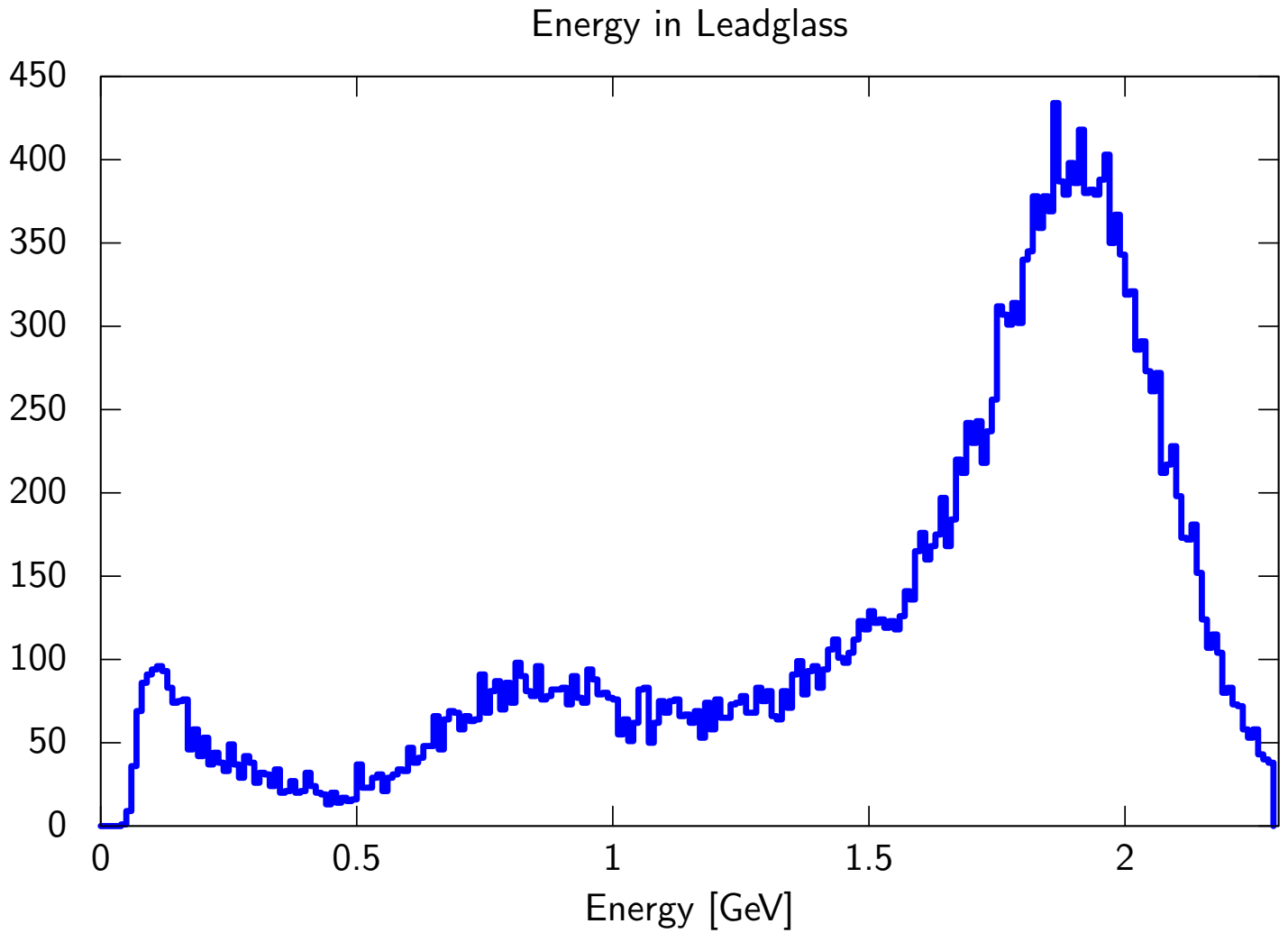
Detector	w/ gas	w/o gas
LGC	16 kHz	7 kHz
PAD	420 Hz	120 Hz
SD	3 kHz	470 Hz
TC	660 kHz	55 kHz

$e^- - e^+$ Difference

$e^- \approx$ factor 2 too high in comparison, but only one rate.

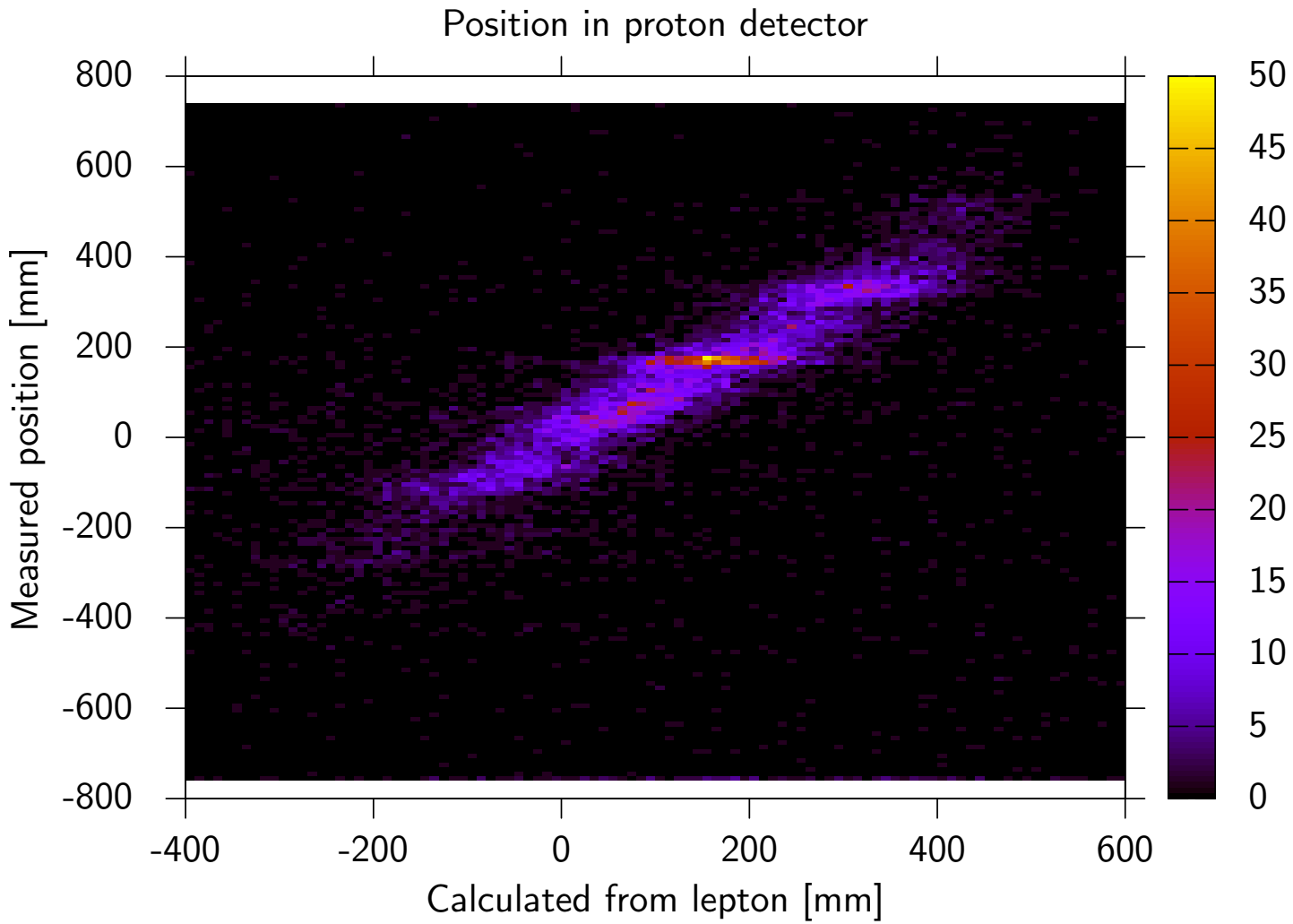
Background countrates scaled mainly quadratically with beam current (rest gas scattering).

Lead Glass Calorimeter LGC



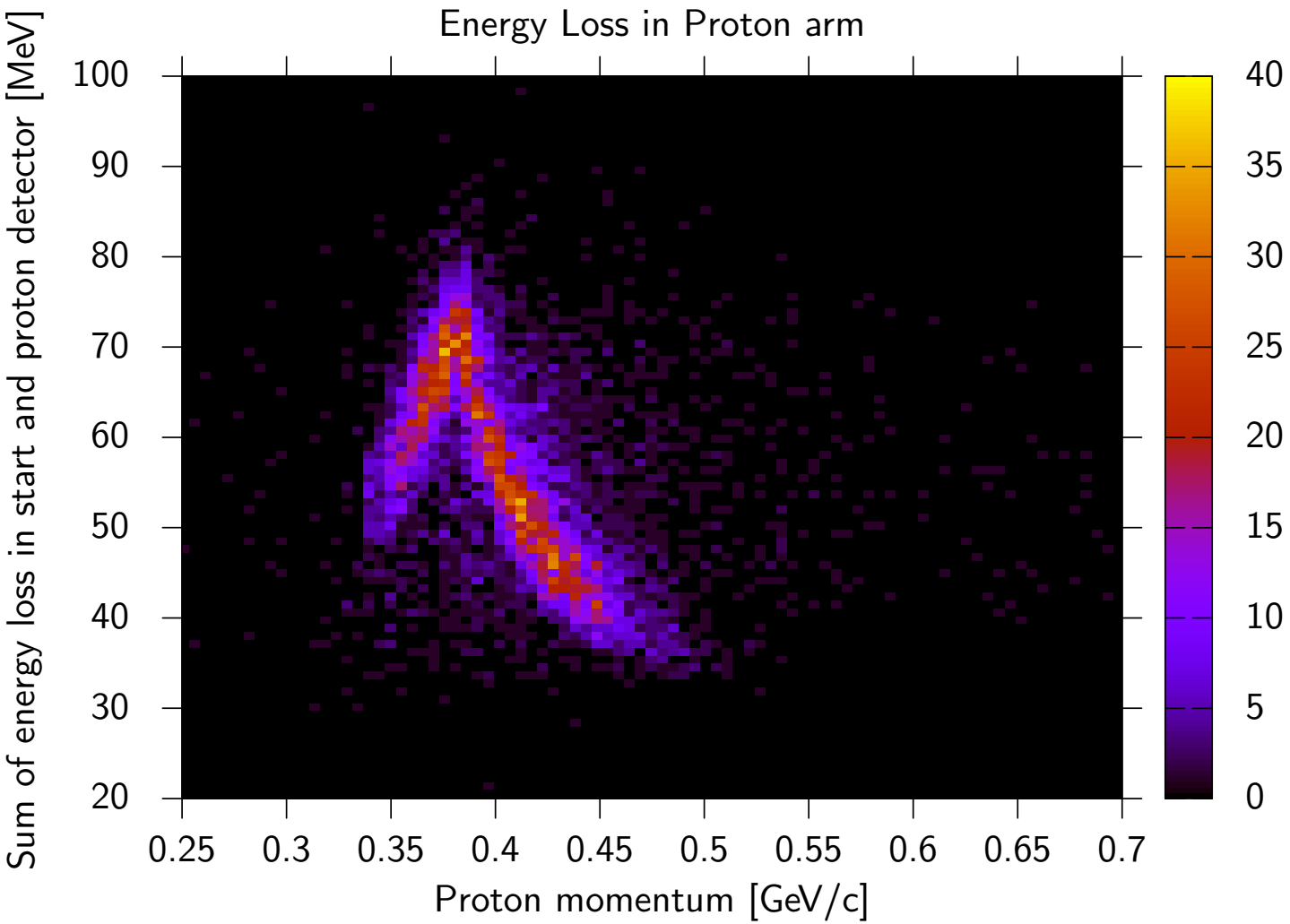
AK + JCB

Proton Arm Detector PAD



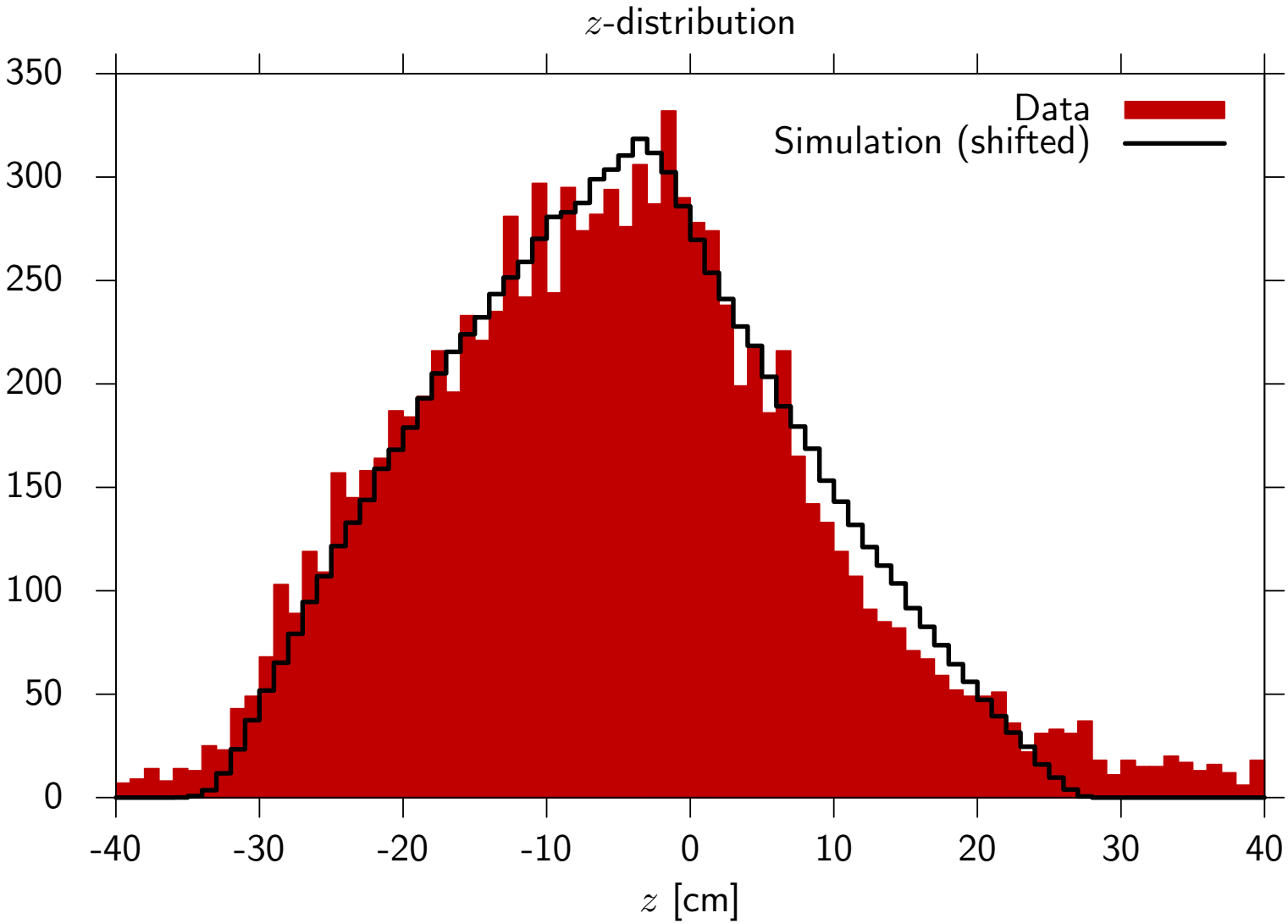
AK + JCB

Start Detector SD + PAD



AK + JCB

MWPCs (Vertex distribution)



AK + JCB

Achievements

- 2 GeV $e^{\pm}$ beam established in DORIS
- Operated target successfully beyond design density
- **Took data sample of elastic ep scattering**
- Measured target density distribution
- Online spectra available

Improvements

- DORIS beam current (partially done)
- Target cell heating (new design)
- DAQ synchronization problems (solved)
- GEM detectors not operational (partially improved)
- Analysis software framework (started)

Per aspera ad astra (Seneca)