

# Detector session summary

David Adey

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*MICE collaboration meeting 34*

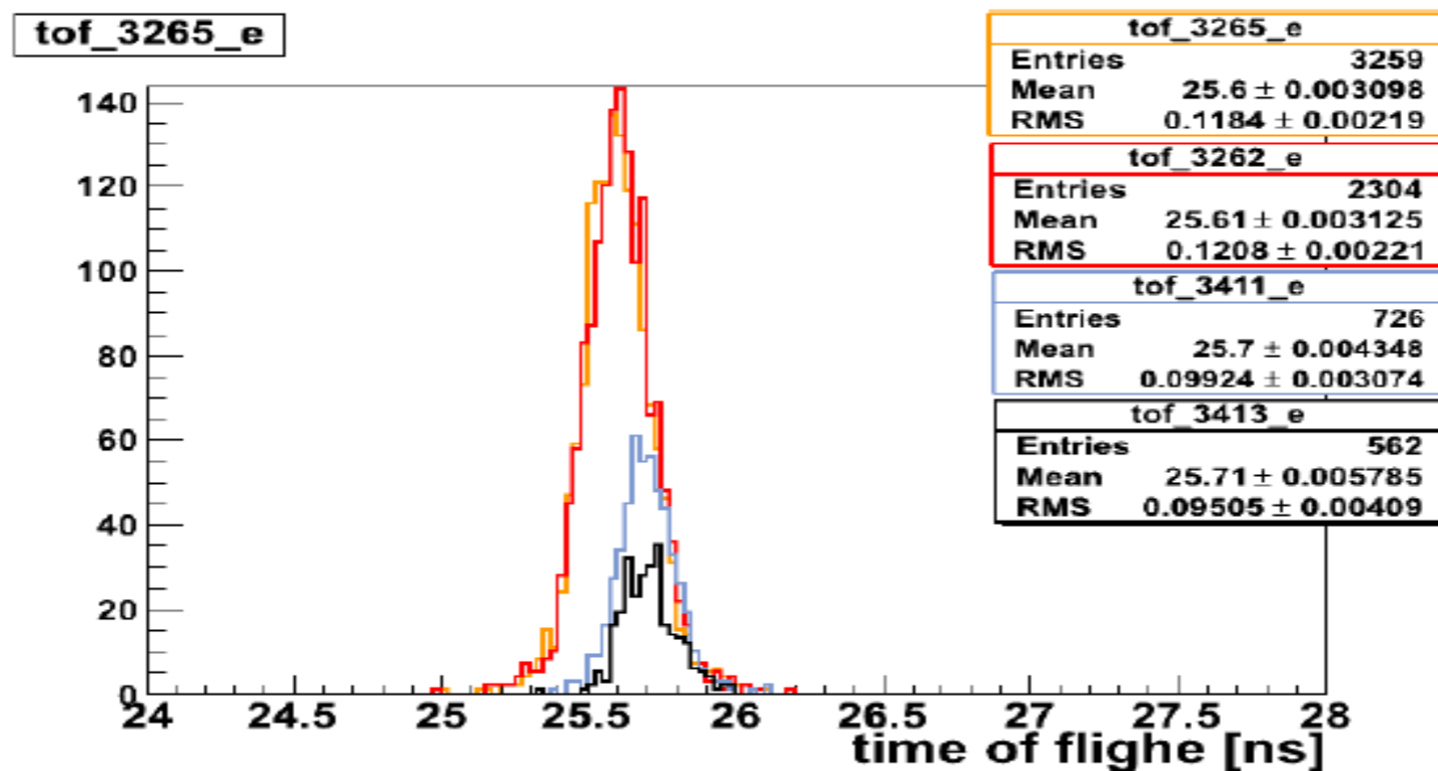
*19th October 2012*

# TOF Shaper Studies

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# From Jordan

$e^+e^-$  puzzle.

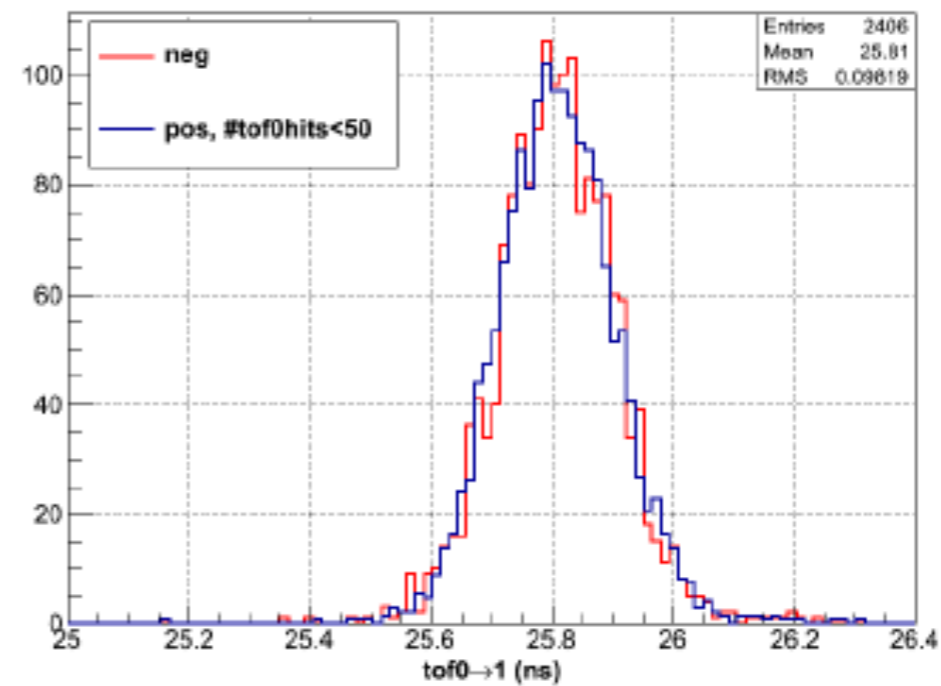
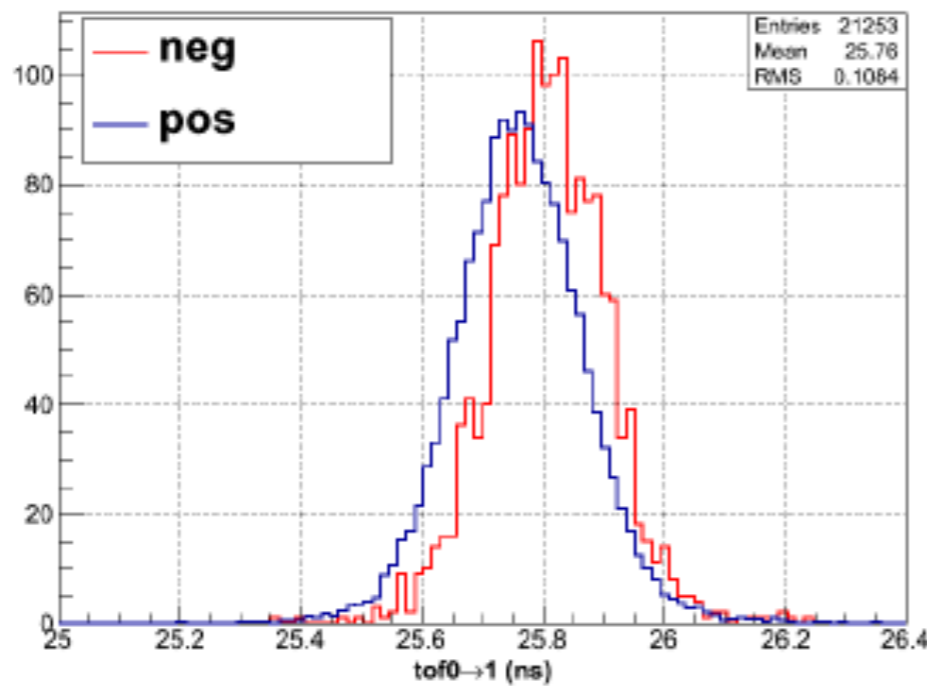


- The variation of the number of particle trigger per spill introduces difference in the measured time-of-flight ( $\sim 100$  ps) even when we use identical settings of the beamline channel.

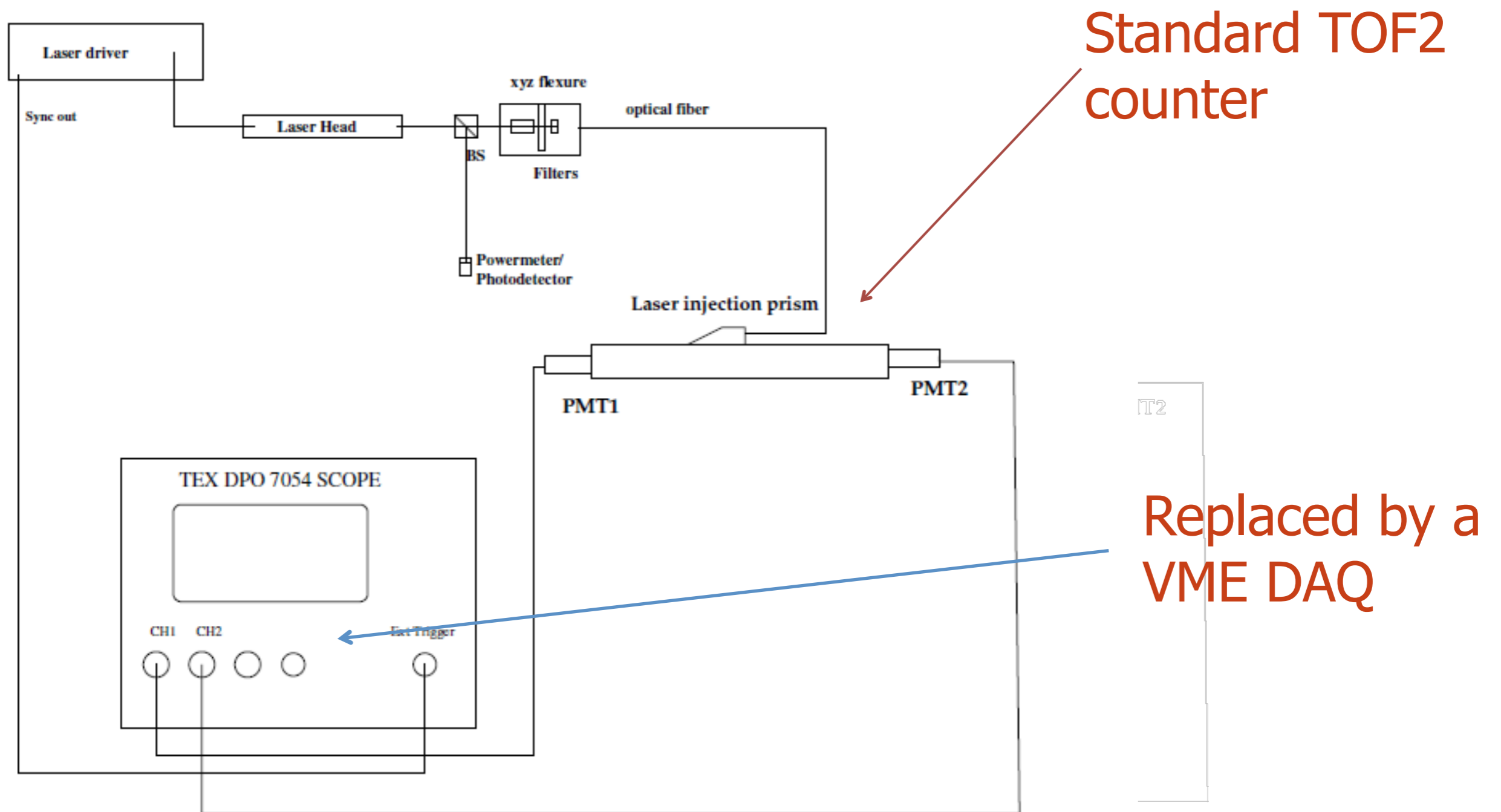
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# From Durga

- First looked at the time of flight for + and – data.
- Left: Obvious shift: e+ have lower tof than e-
- Right: No difference when only lower hit rate + data is selected



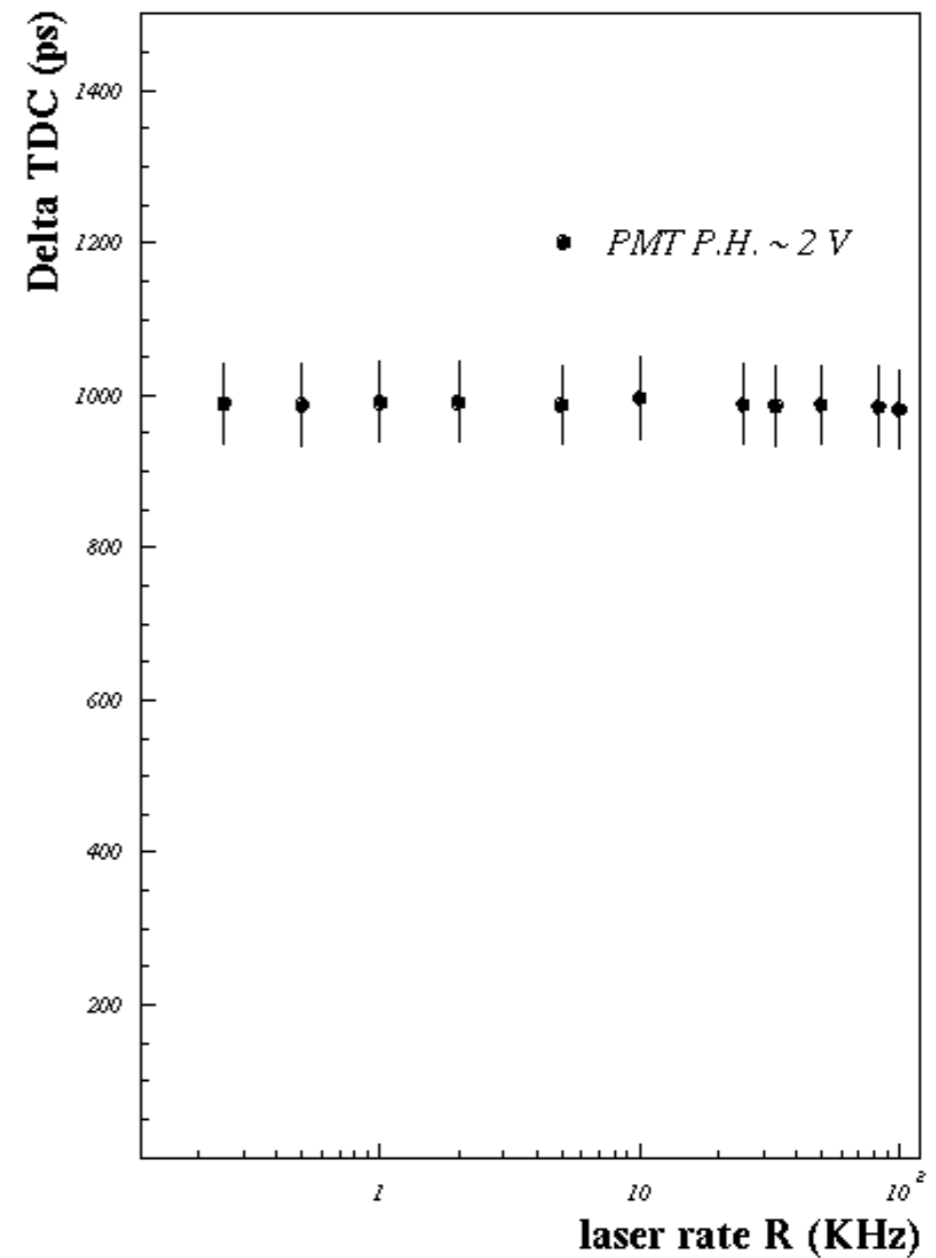
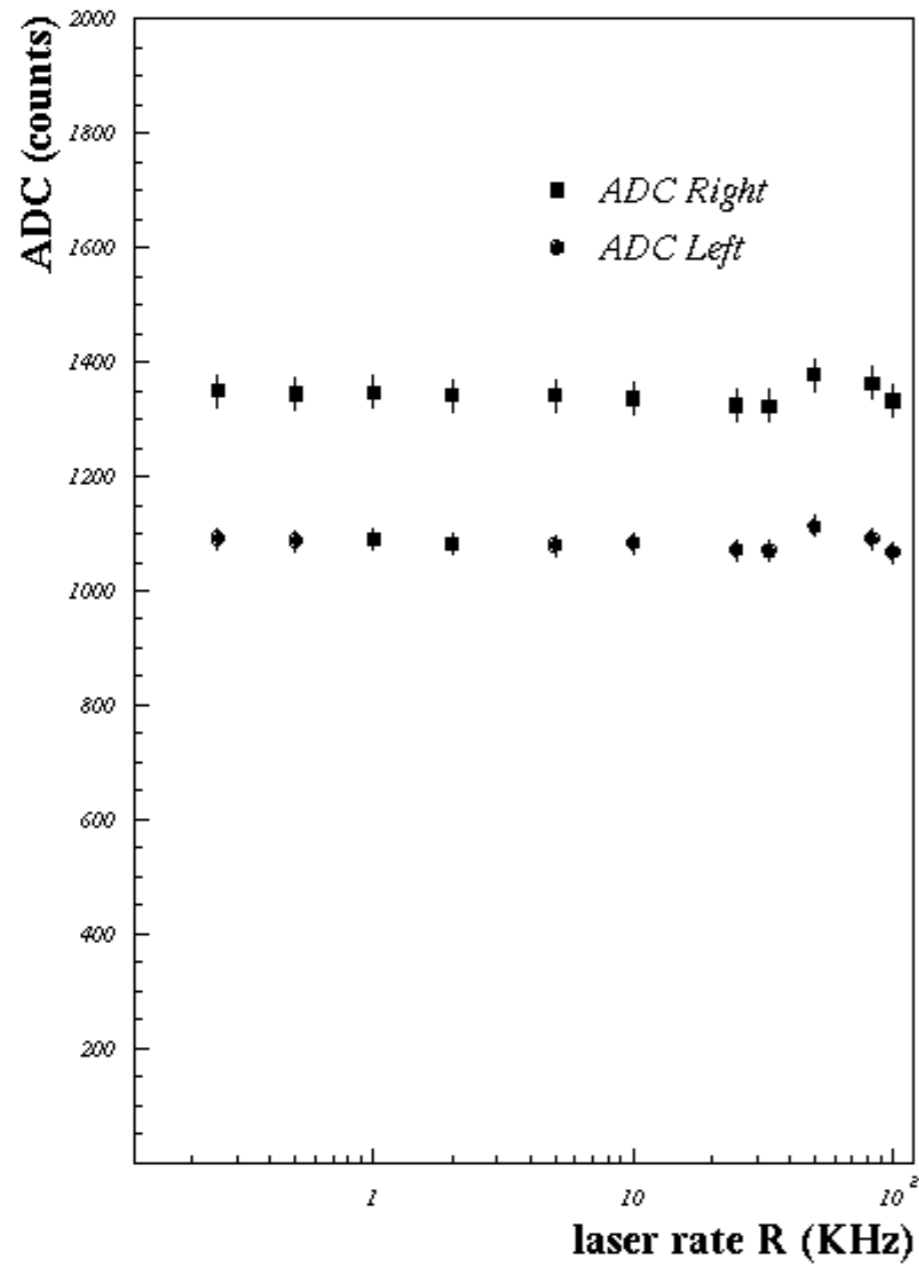
# Test setup



# Laser

- Use an home-made laser diode at  $\sim 400$  nm based on a fast Avtech AVO-9A-C pulser and a NICHIA 50 mW violet diode laser
    1. Laser pulses width selectable between 120 ps and 3 ns length, with a  $\sim 200$  ps risetime (simulate scintillator response)
    2. Laser pulse height selectable to give scintillator response between a fraction of MIP and 10-50 MIPS
    3. Laser repetition rate selectable between  $\sim 100$  Hz and 1 MHz
1. Signal from scintillation counter  $\sim 1-2$  MIP
  2.  $\Delta t$  between two PMTs
  3. Apparently no effect for PMTs +TDCs, but need a reference  $t_0$  to be cply sure

# Results



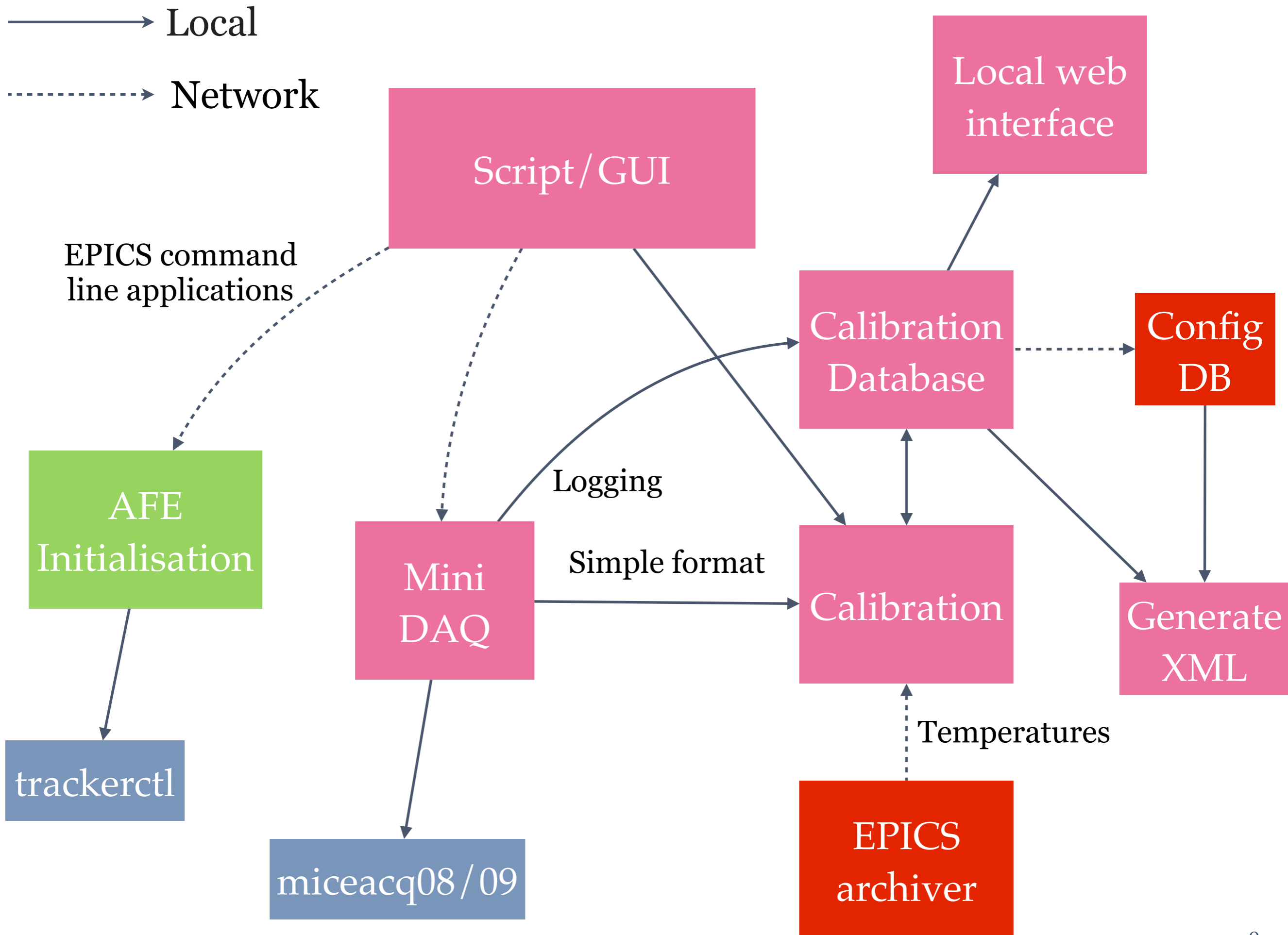
# Tracker Calibration DAQ

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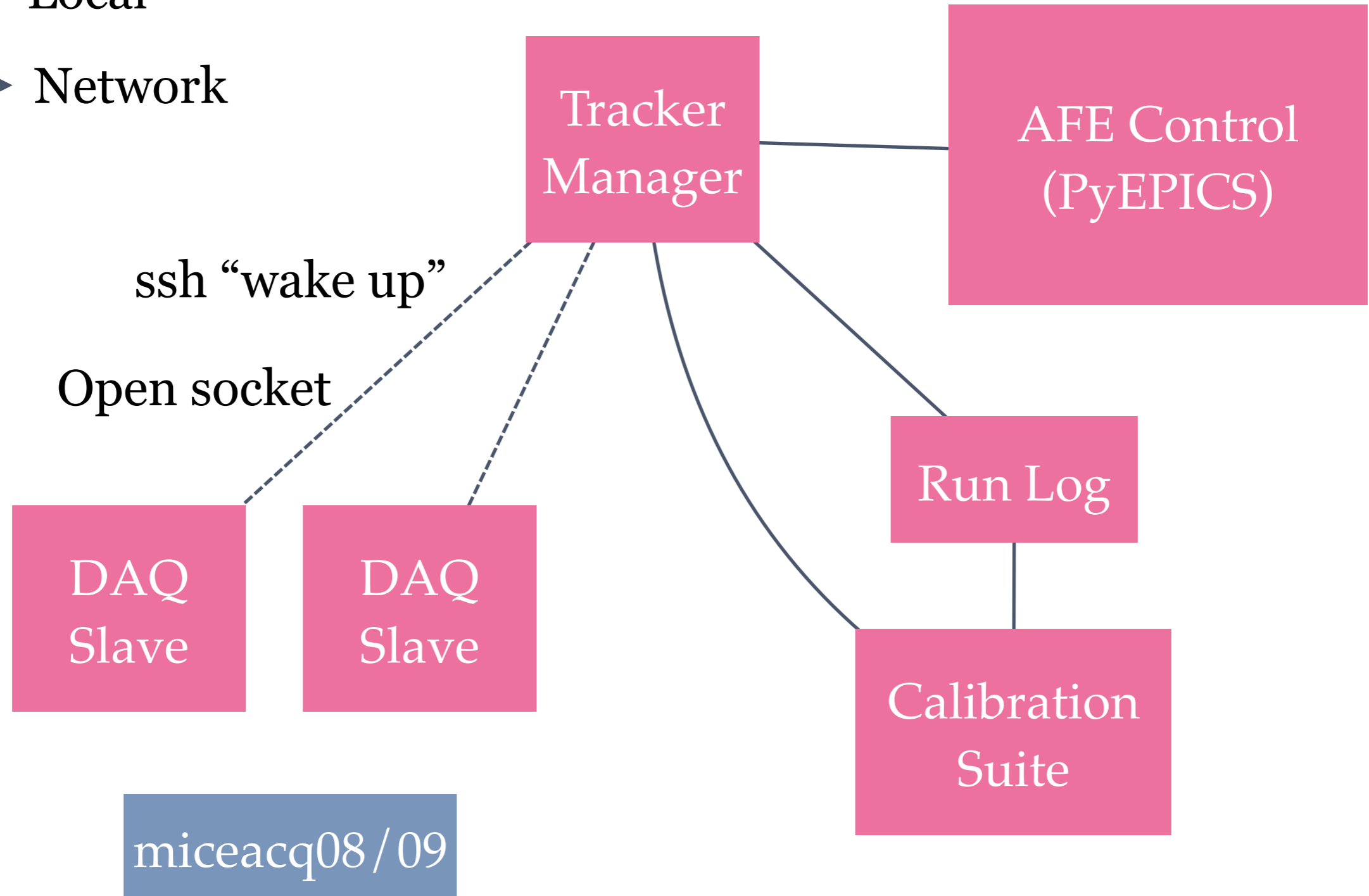
→ Local

⋯ Network

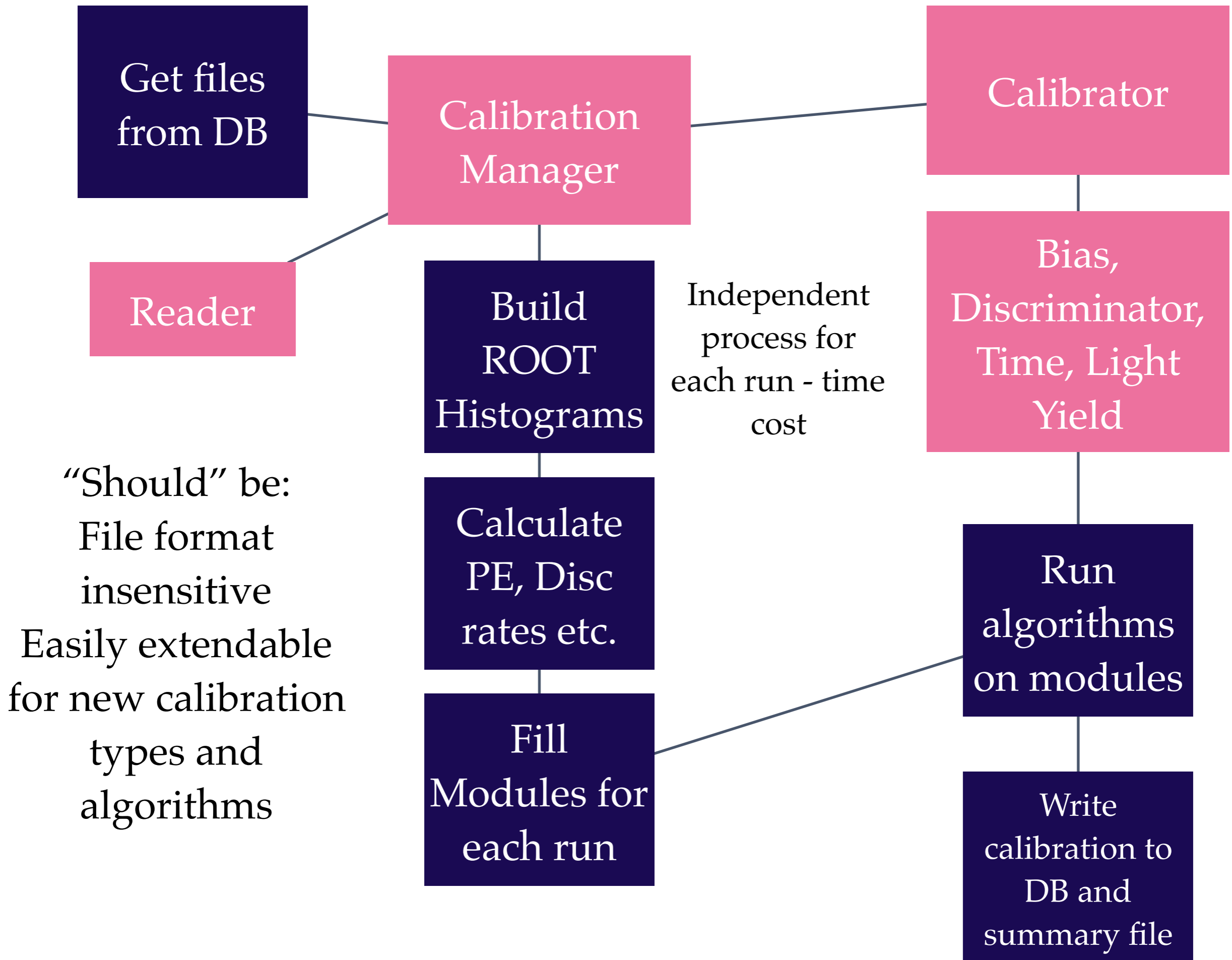


→ Local

⋯ Network



Local readout application multi-reads VLSB banks  
and builds ADC histograms at each spill  
Limits run file size to 4MB / tracker



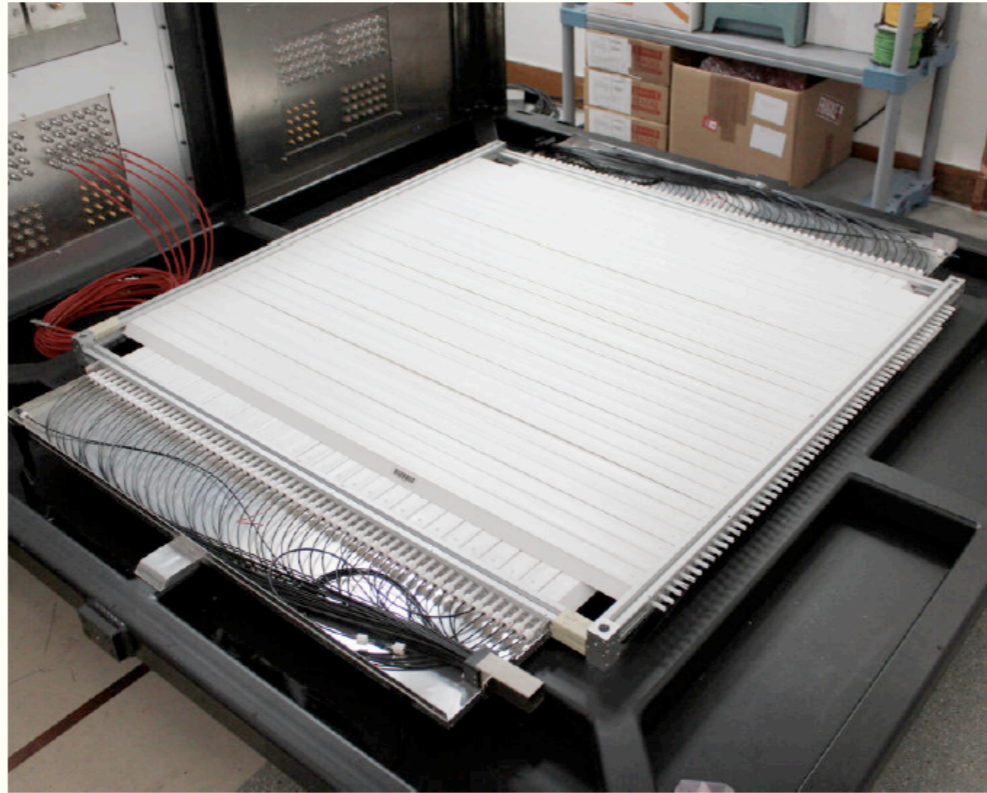
# Done and ToDo

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- **Done:** Code infrastructure; event building; calibration suite (including bias, discriminator, timing, light yield); database interface; logging; unpacking; electronics simulation for testing; VME interface classes
- **ToDo:** PyEPICS and AFE programming; socket interface; test on the real thing; summary and sample histograms; parallelisation of calibration routines; finish unit tests and documentation

# EMR Update

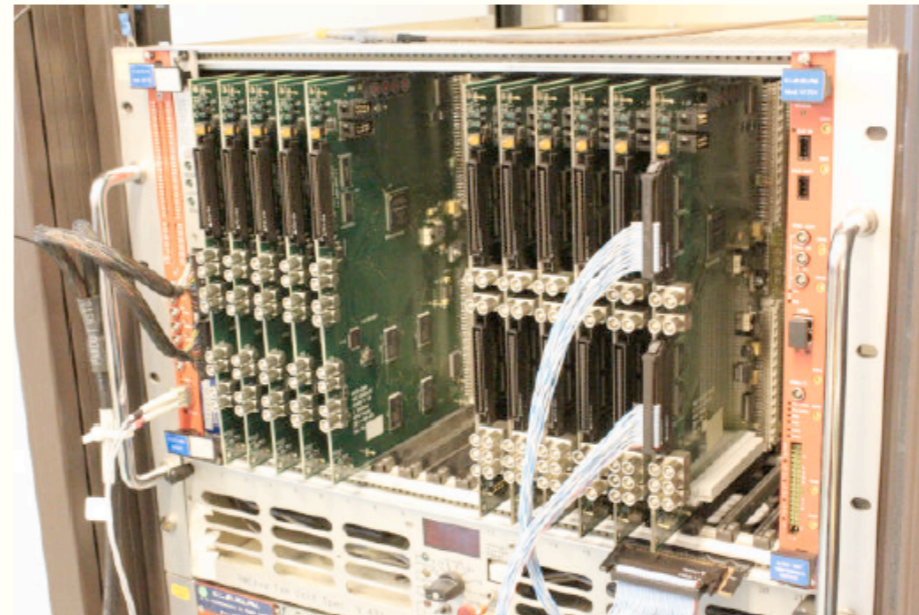
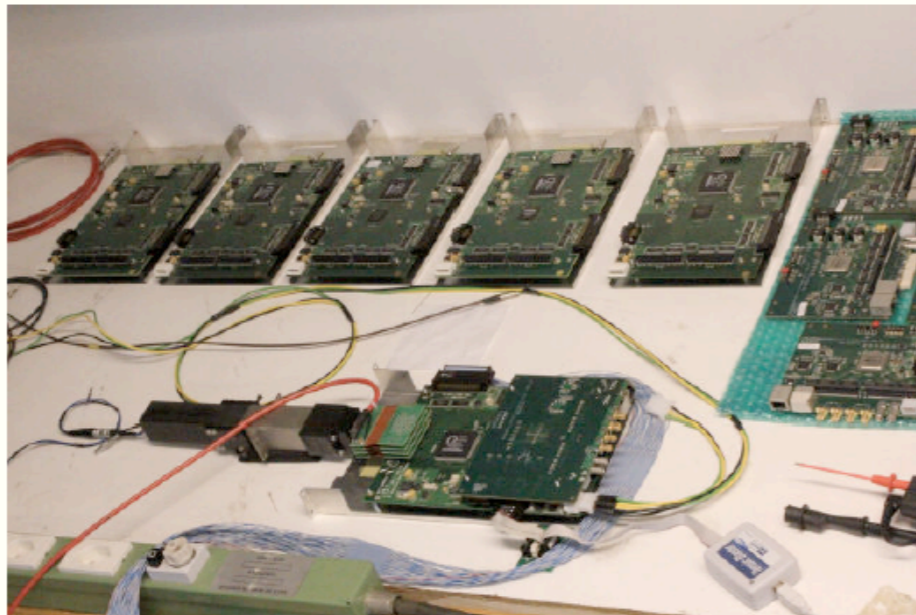
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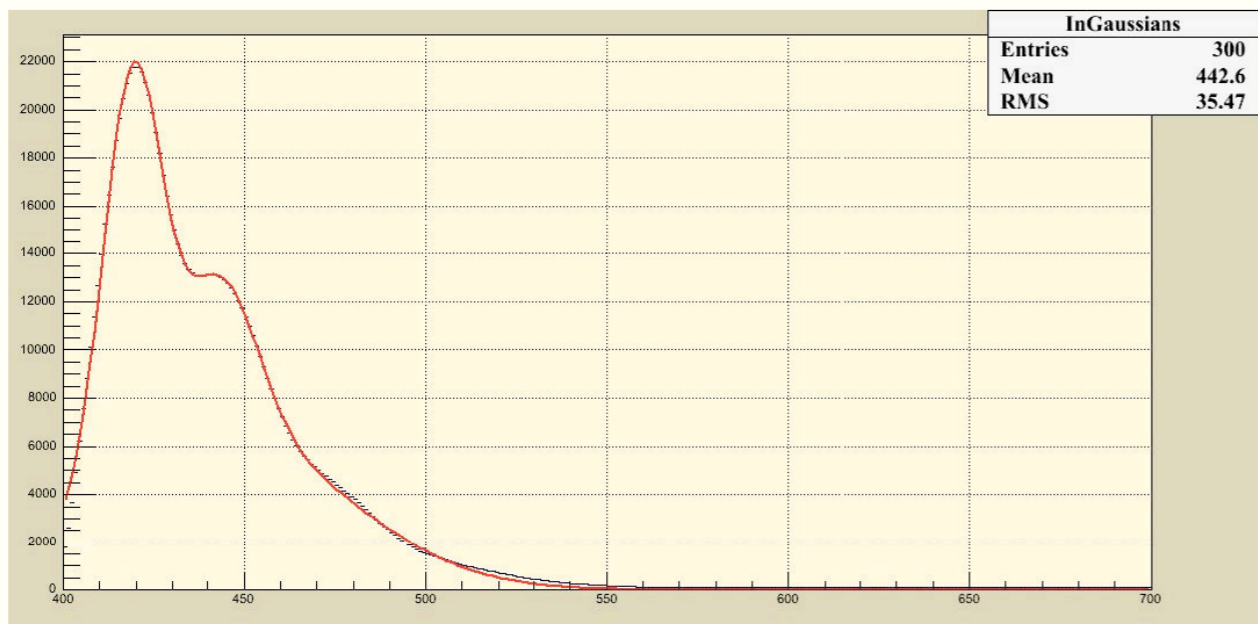
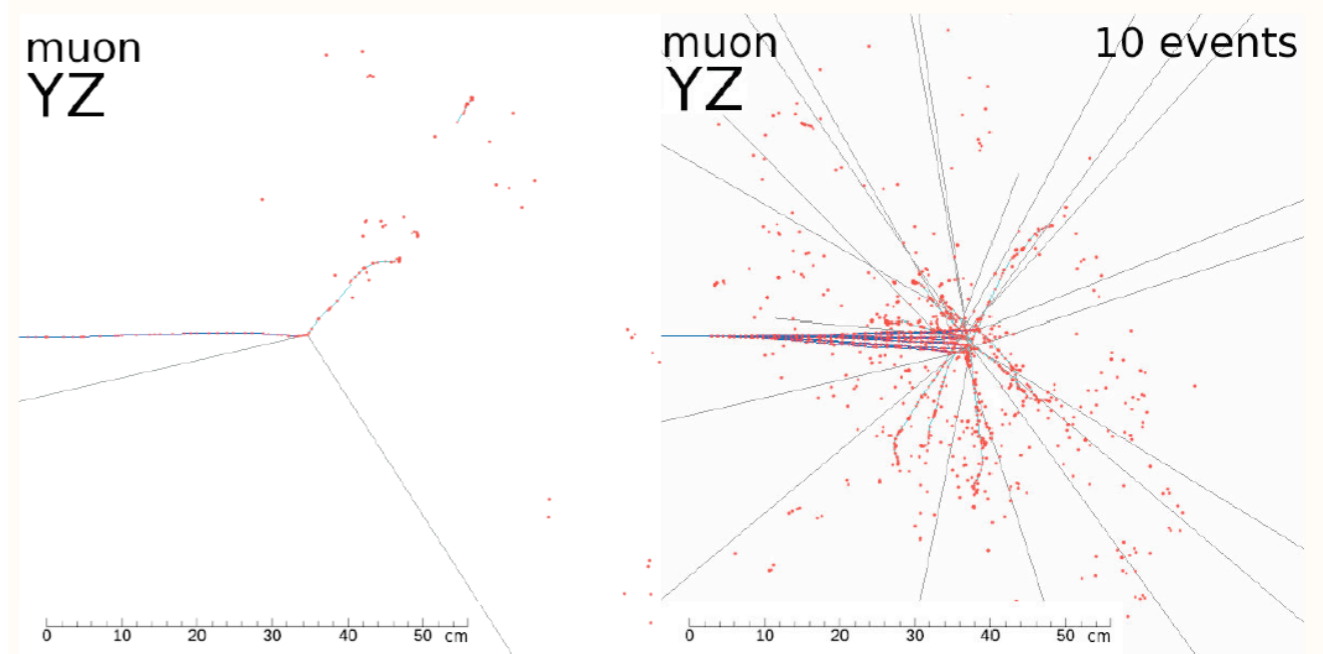
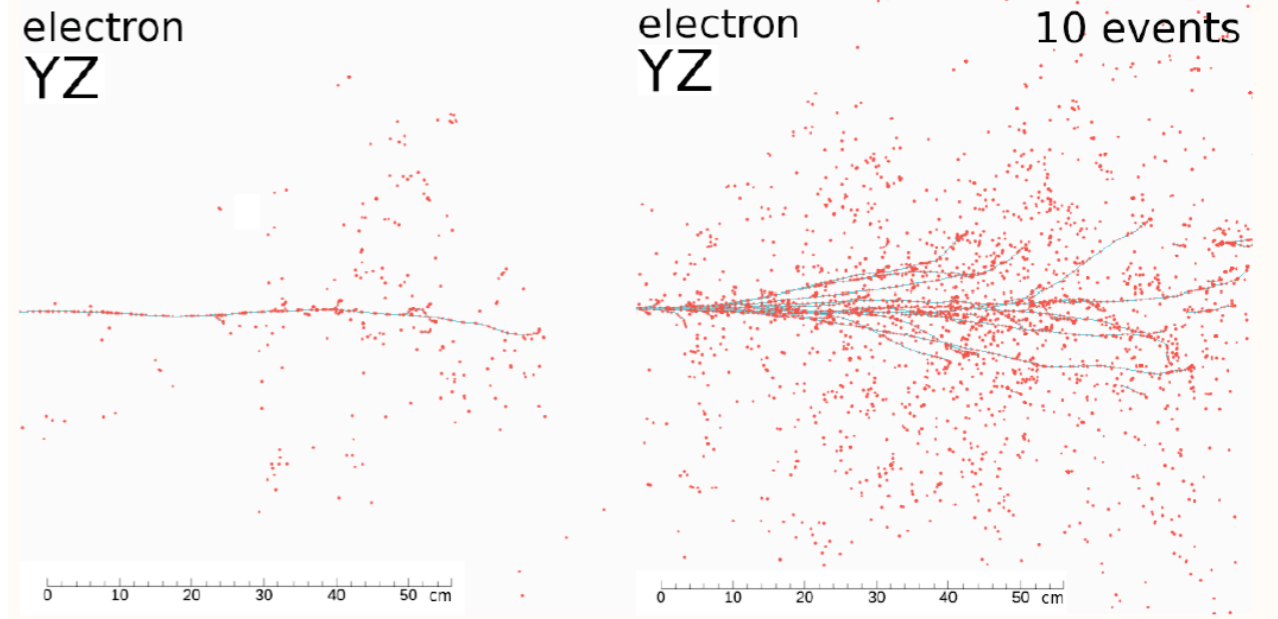
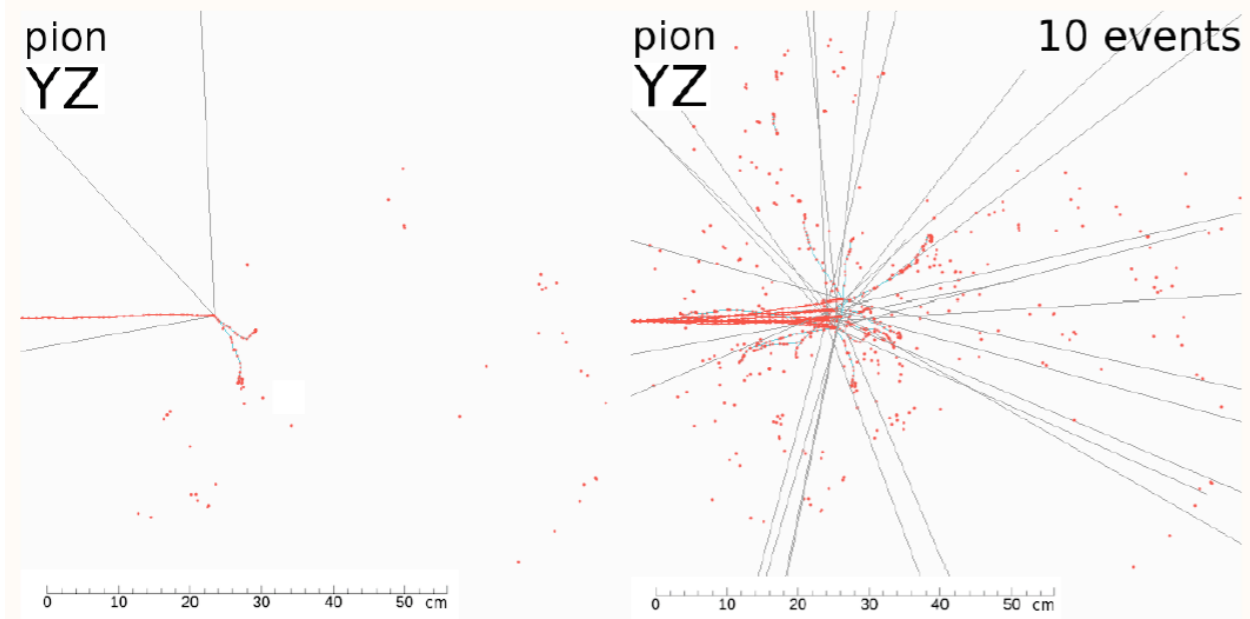
- 100% of bars glued ( $\sim 3300$ )
- 50% polished



- one plane was assembled in its final configuration
- ... and tested with digital camera

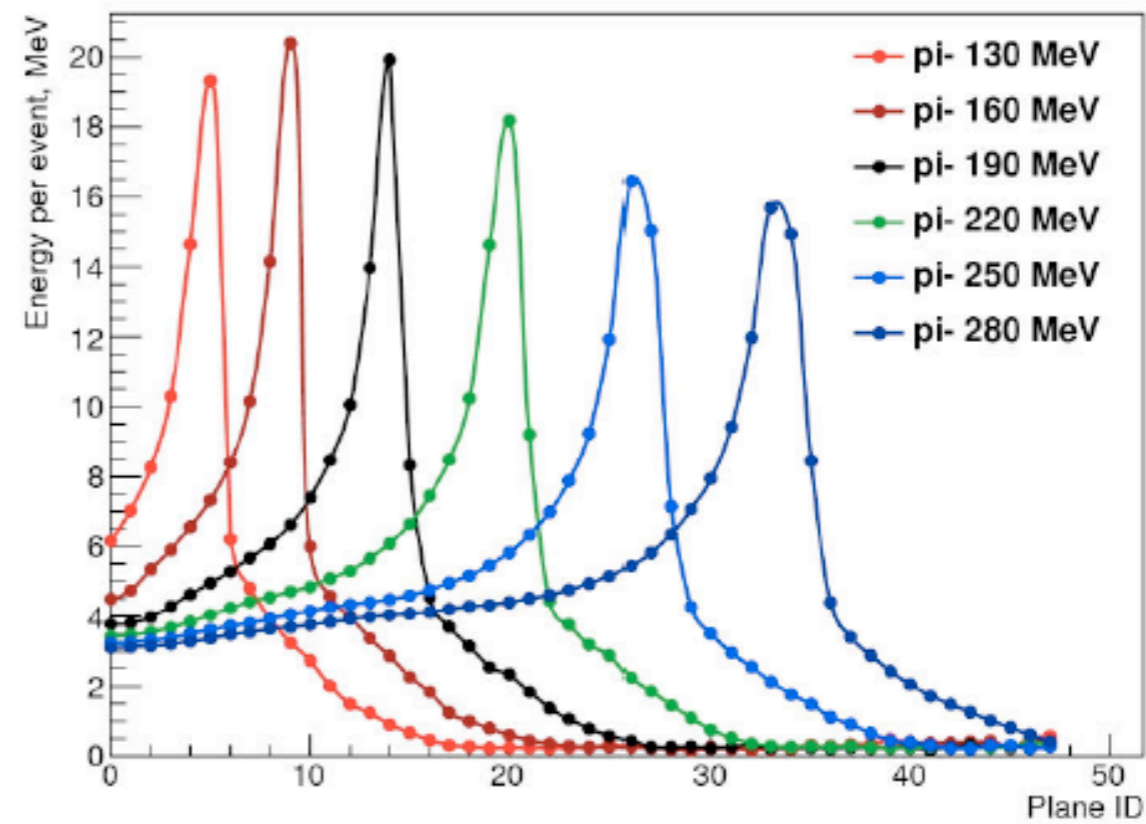
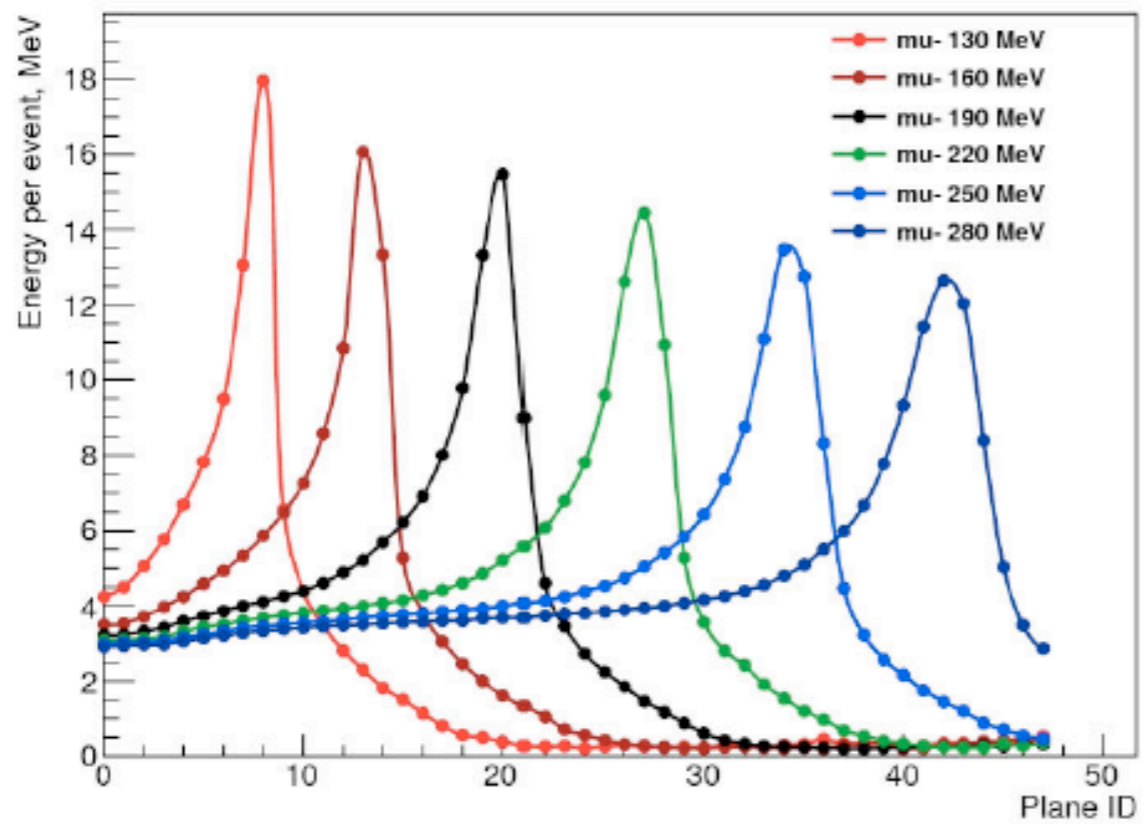
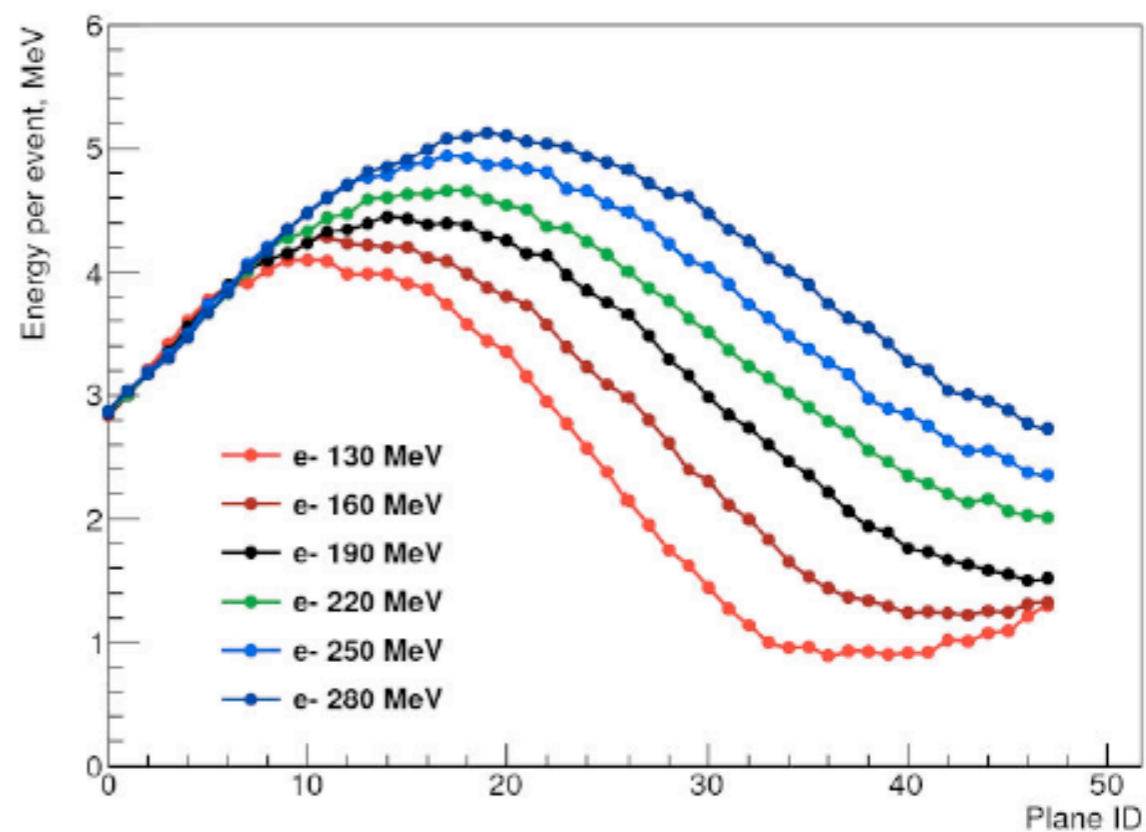
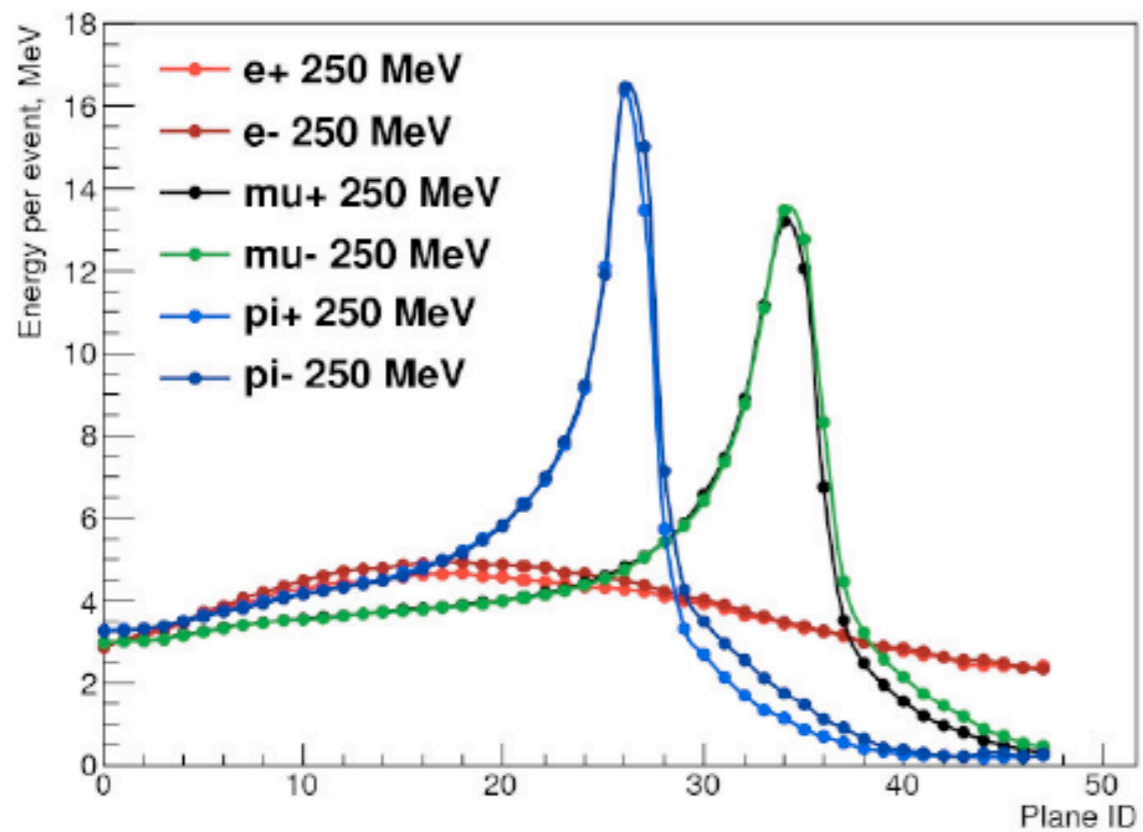


- next two months will be dedicated to the firmware revision and finalization



- the emission spectra was experimentally measured (black)
- experimental data well described by the simulation (red)

Simulation of electron,  
muon, pion range in  
EMR





# Summary

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- Progress on EMR bar production and polishing; firmware under development over coming months; simulation of scintillator and range of particle types.
- Studies of the TOF front end electronics show no immediate candidate for  $e^+/e^-$  time of flight issue
- Tracker automated system in progress, along with development of calibration algorithms for frequent optimisations