Thinking about Disc DIRC Calibration/Monitoring (online)

PANDA Collaboration meeting
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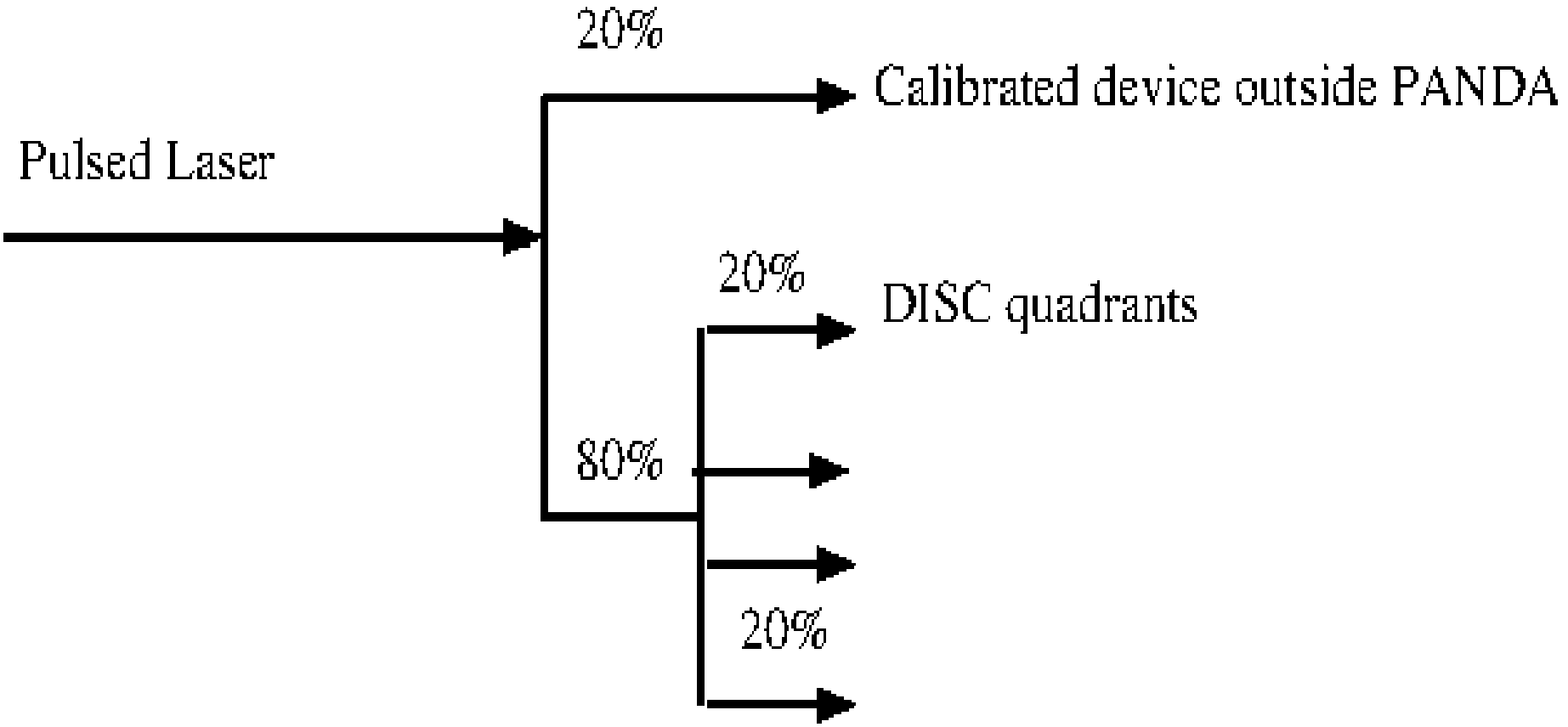
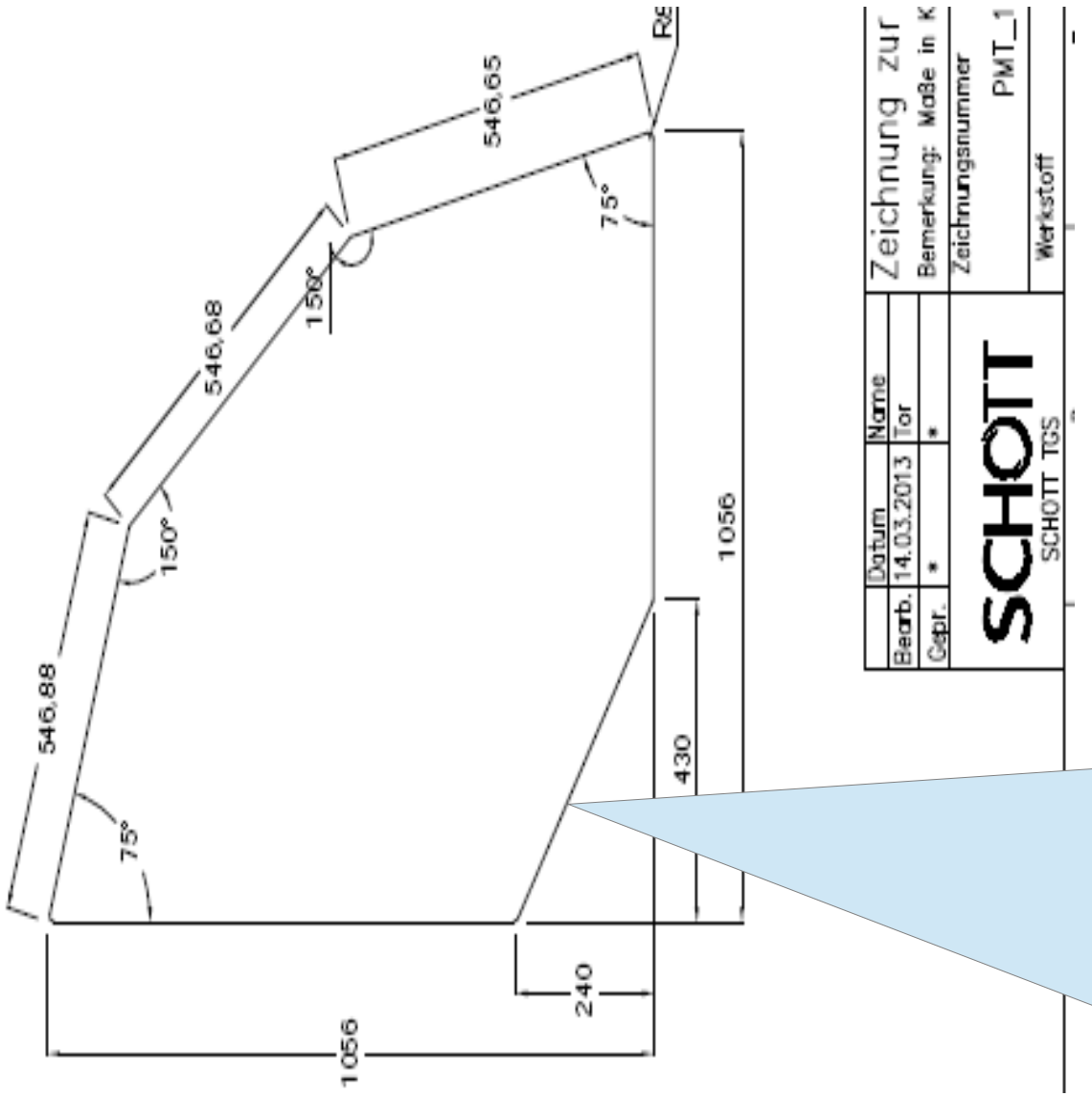
JLU Gießen

a graph how we see a version of Calibrations/Monitoring



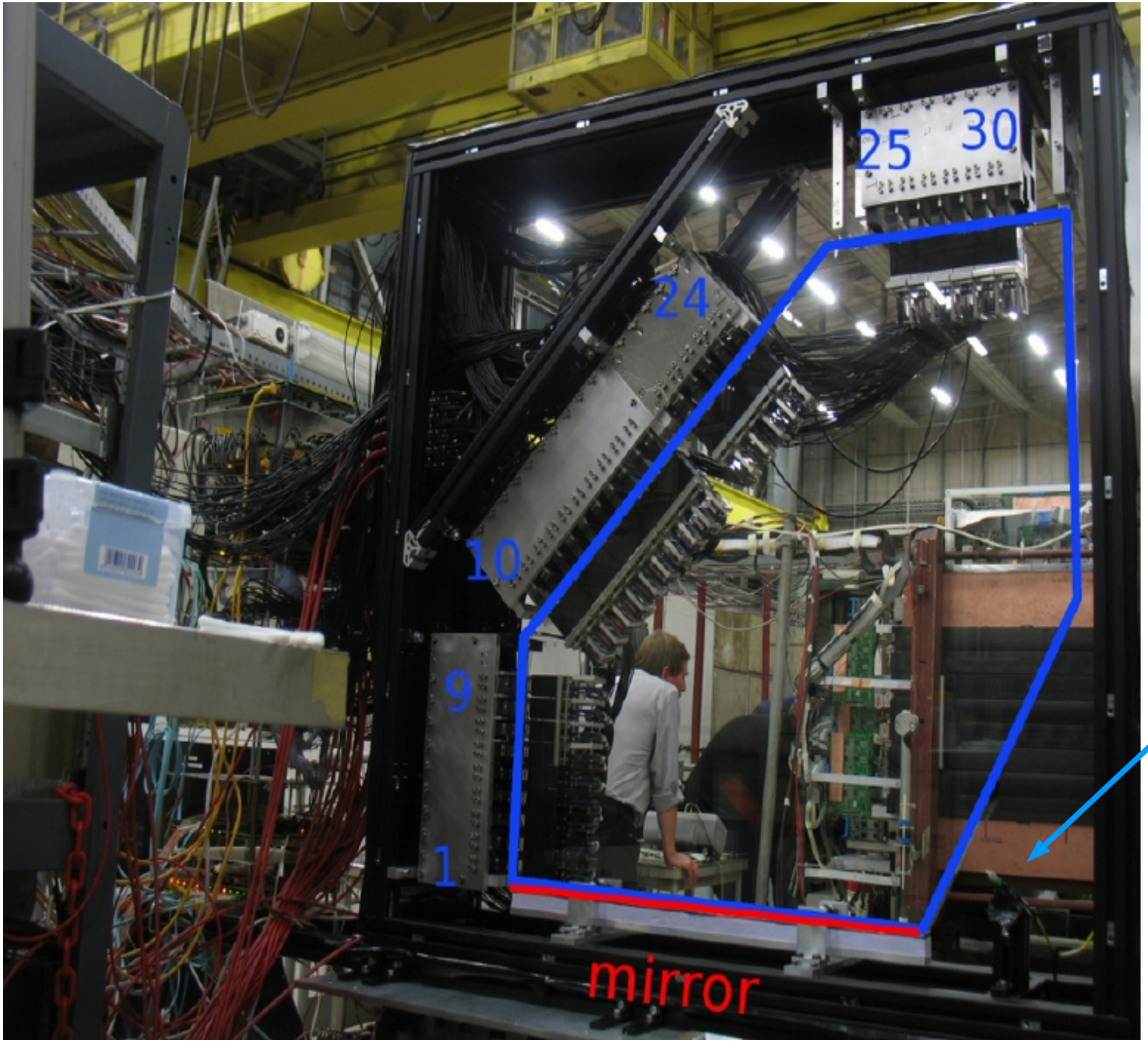
The device outside PANDA should be stable enough(like ATLAS TileCal for example) to judge about Laser pulse stability
and the Laser should be fast, intense and frequent enough to perform measurement In short time(in between PANDA Runs for example)

fiber shinning inside Disc



An “multi-mode” fiber coming from Laser shinning in a “diffuse” way inside Disc should hit every channel of photon detector producing
A signal that is sensitive to the Disc and photon detector characteristics

Exercising on Prototypes

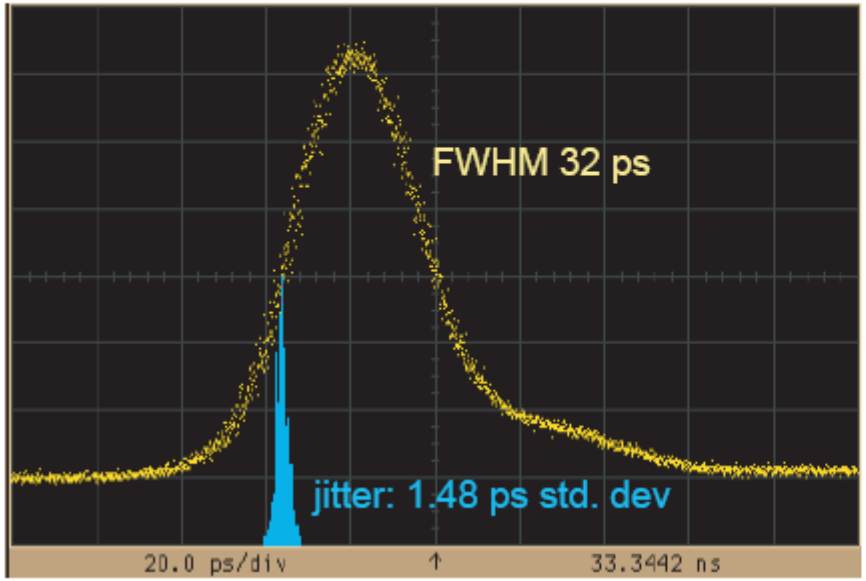


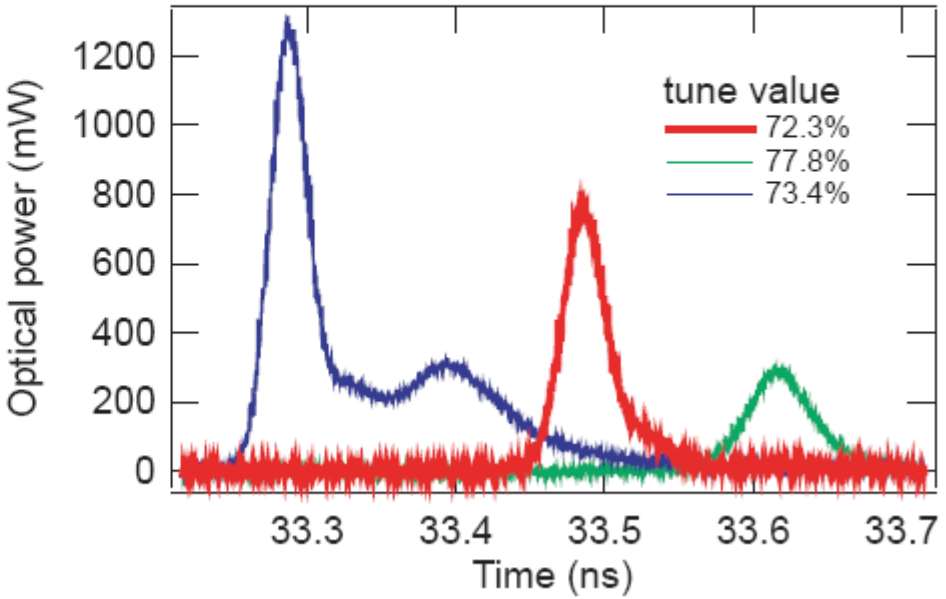
PiLas Laser fiber

PiLas Laser

Sample data of a PiLas with center wavelength of 405 nm (PiL040)

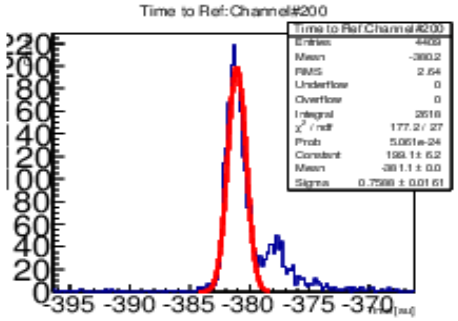
Sampling oscilloscope data

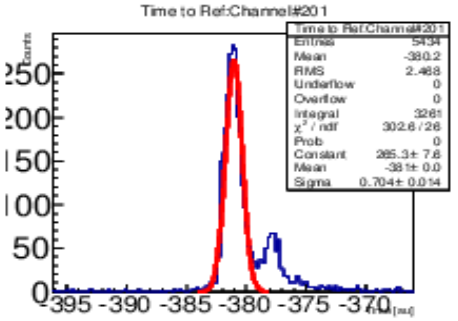


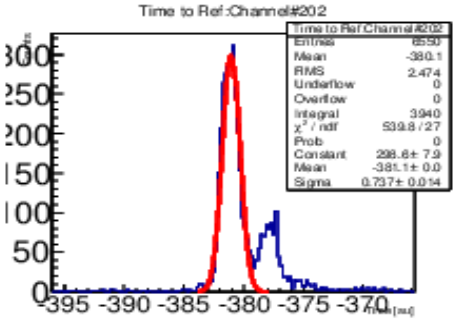


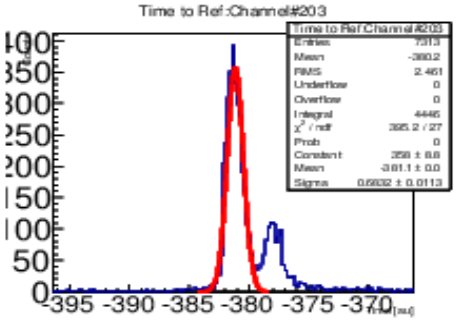
Possibility to Run using Internal/External Triggers up to 1 MHz
One can “match” in discrete way the wavelength to the photon detector QE maximum
More than 200mW peak power yield, enough to get ...see next page

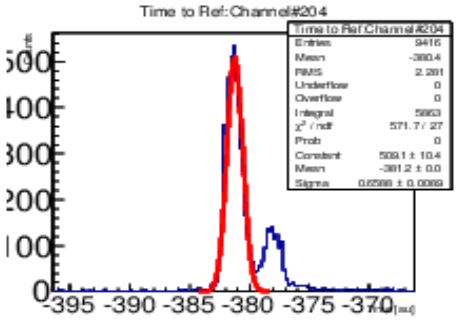
Time spectra pro PMT

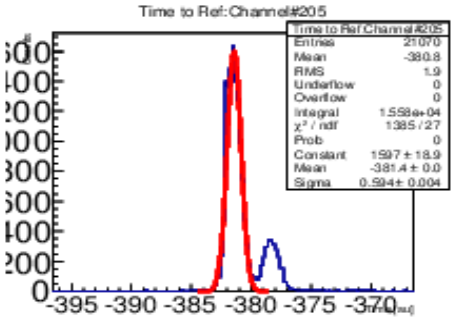


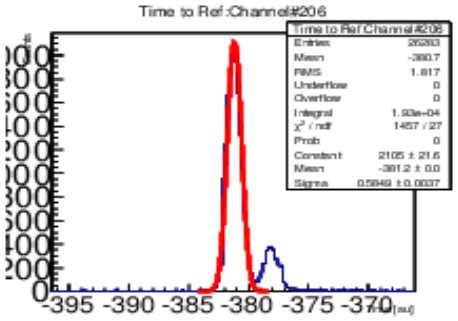


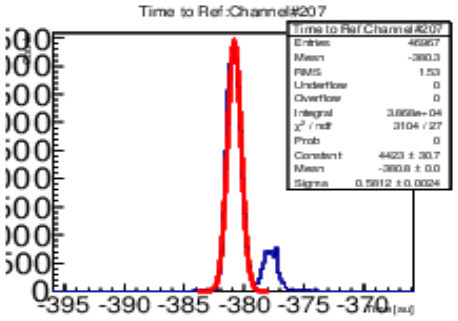


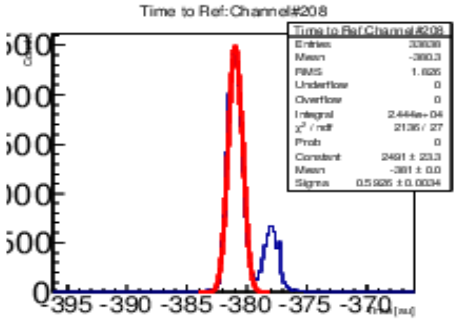


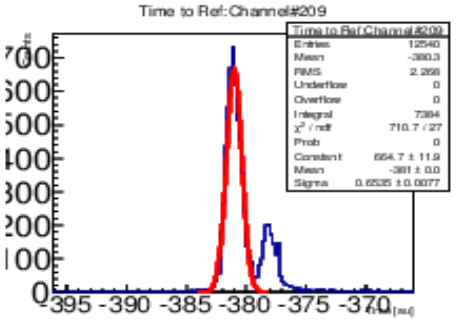


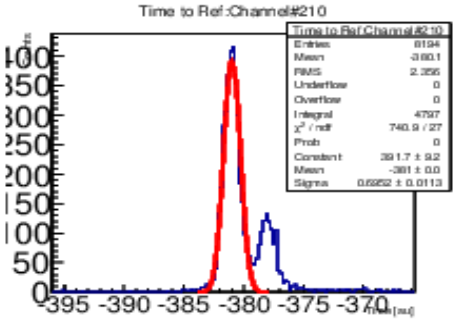


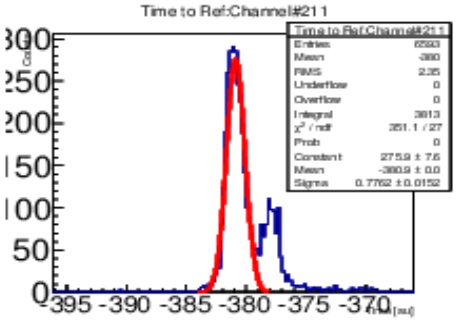


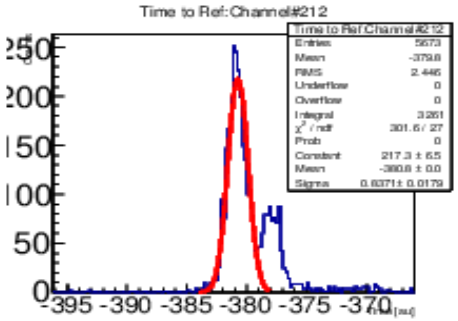


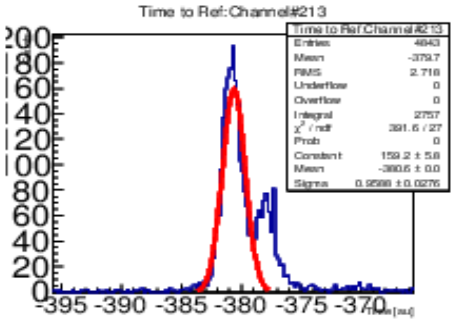


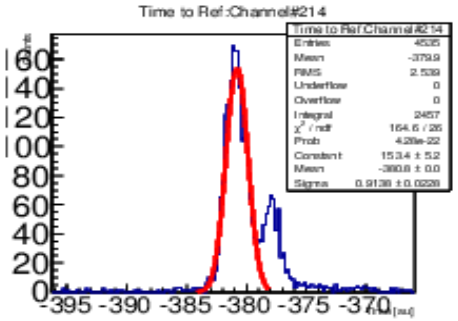


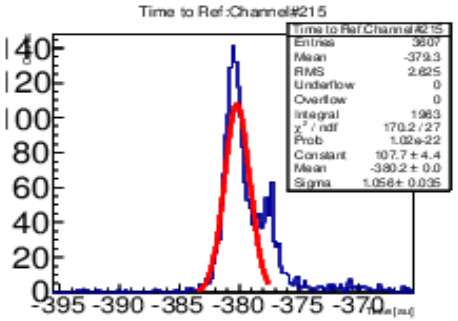




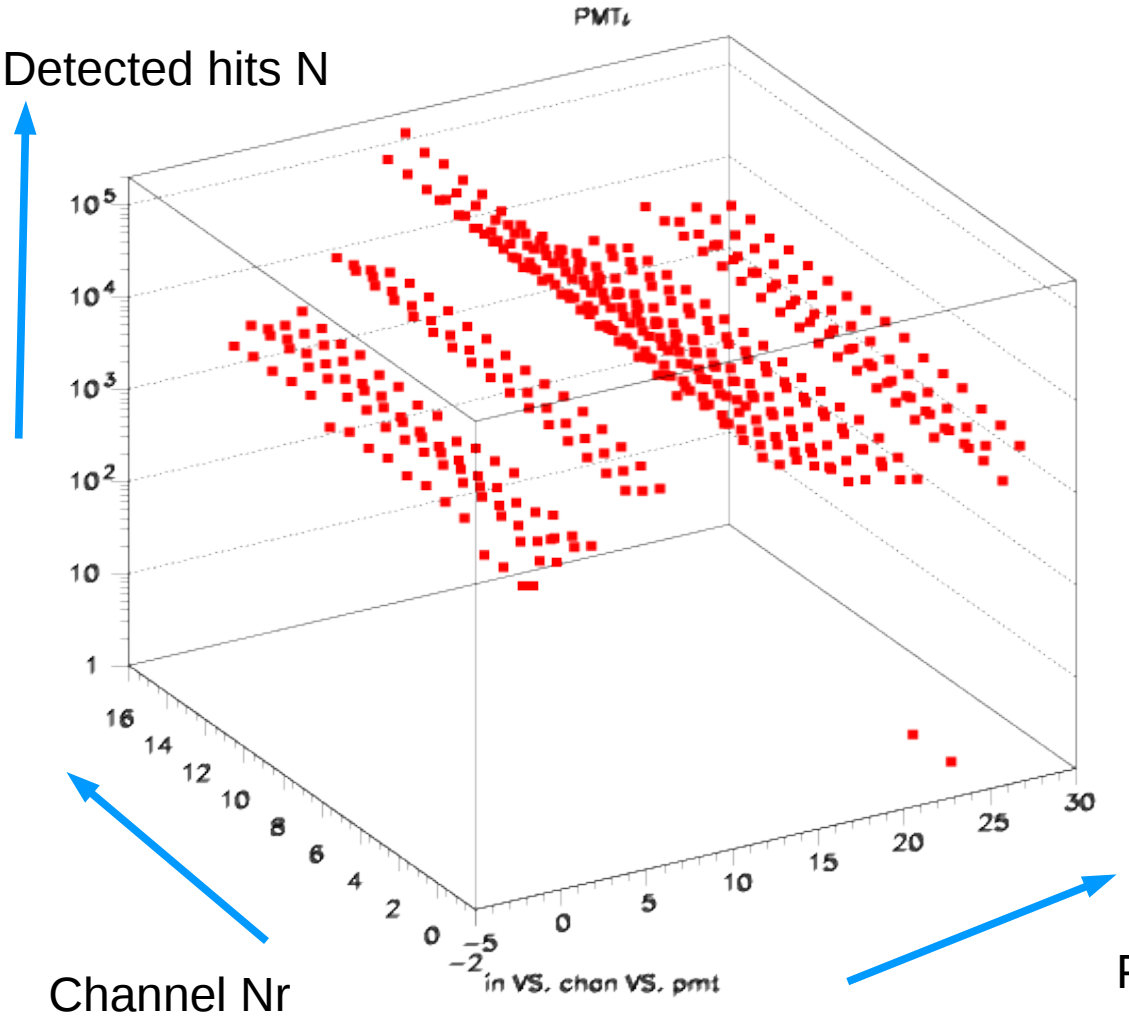








Result from <5min Laser Run

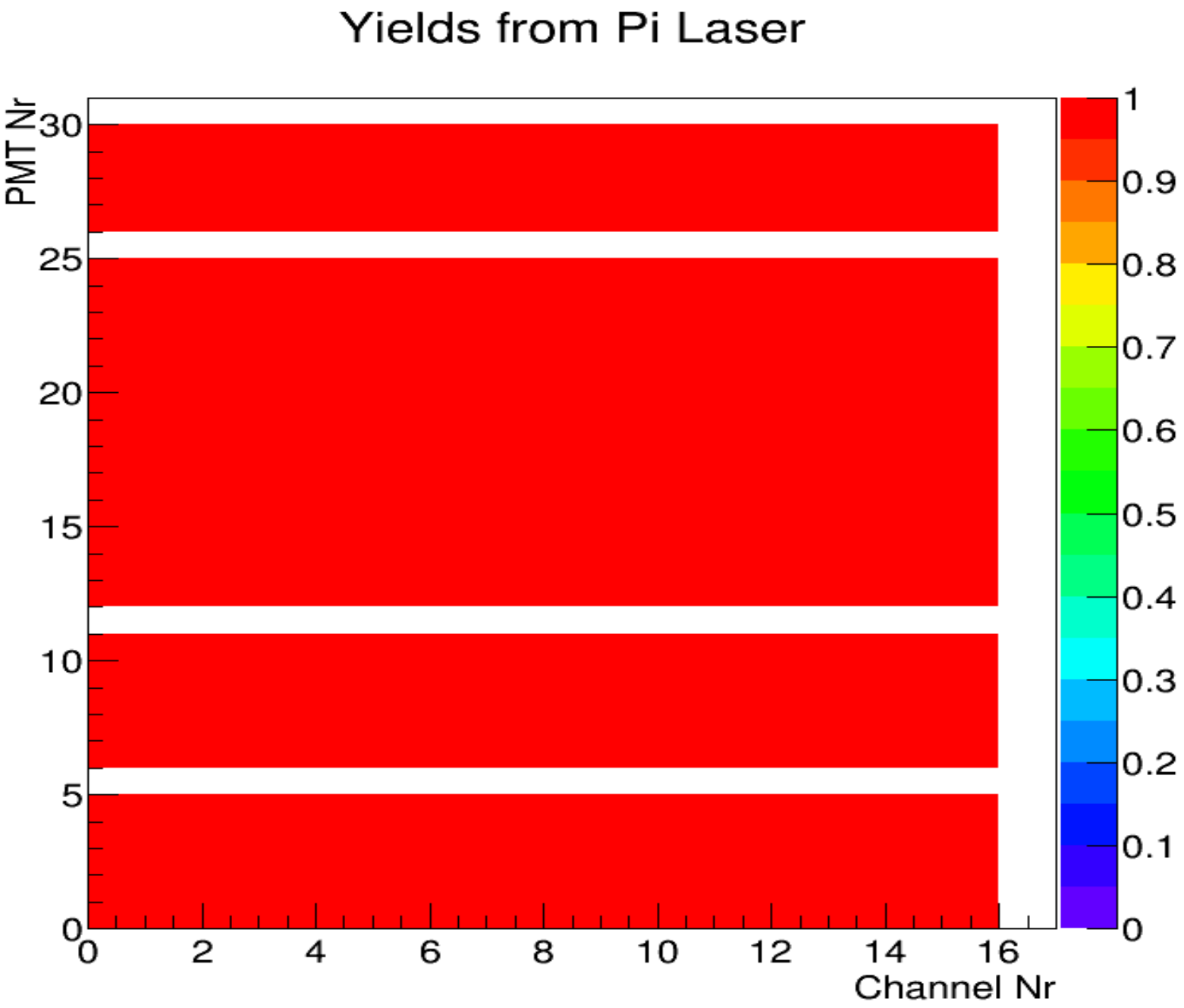


More than 1k detected photons for every channel

The Coverage shows that one can get photons at every Possible Cherenkov angle

Imitating different momenta for Incoming tracks

Functionality of DISC CERN Prototype checked by LMS



-If Chn. Contains 1k Events === 1

-one can monitor the Peak position. i.e. Calibration

-Peak width, i.e. Chn. Quality

-Peak Integral, i.e. Radiator+Photon Detector stability

In addition to LMS, CERN prototype used also

- two Systems for Calibration/Monitoring

  TOF(made in FAU Erlangen, West Germany) and Threshold Cherenkov(CERN made)(see Gießen talks in previous PANDA PID sessions)
- most likely each of those systems contributed in success of that campaign, yielding PID probability estimation from test measurement
- sure for final DIRC also we have to use different systems for Calibration/Monitoring and one of them is LMS