

The Giessen prototype developments
in between two beamtimes

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Gießen University

PANDA-PID-meeting 11-September-2012

- *Testbeam at DESY in June 2012*
- *Testbeam at CERN in September 2012*

Testbeam at DESY in June 2012



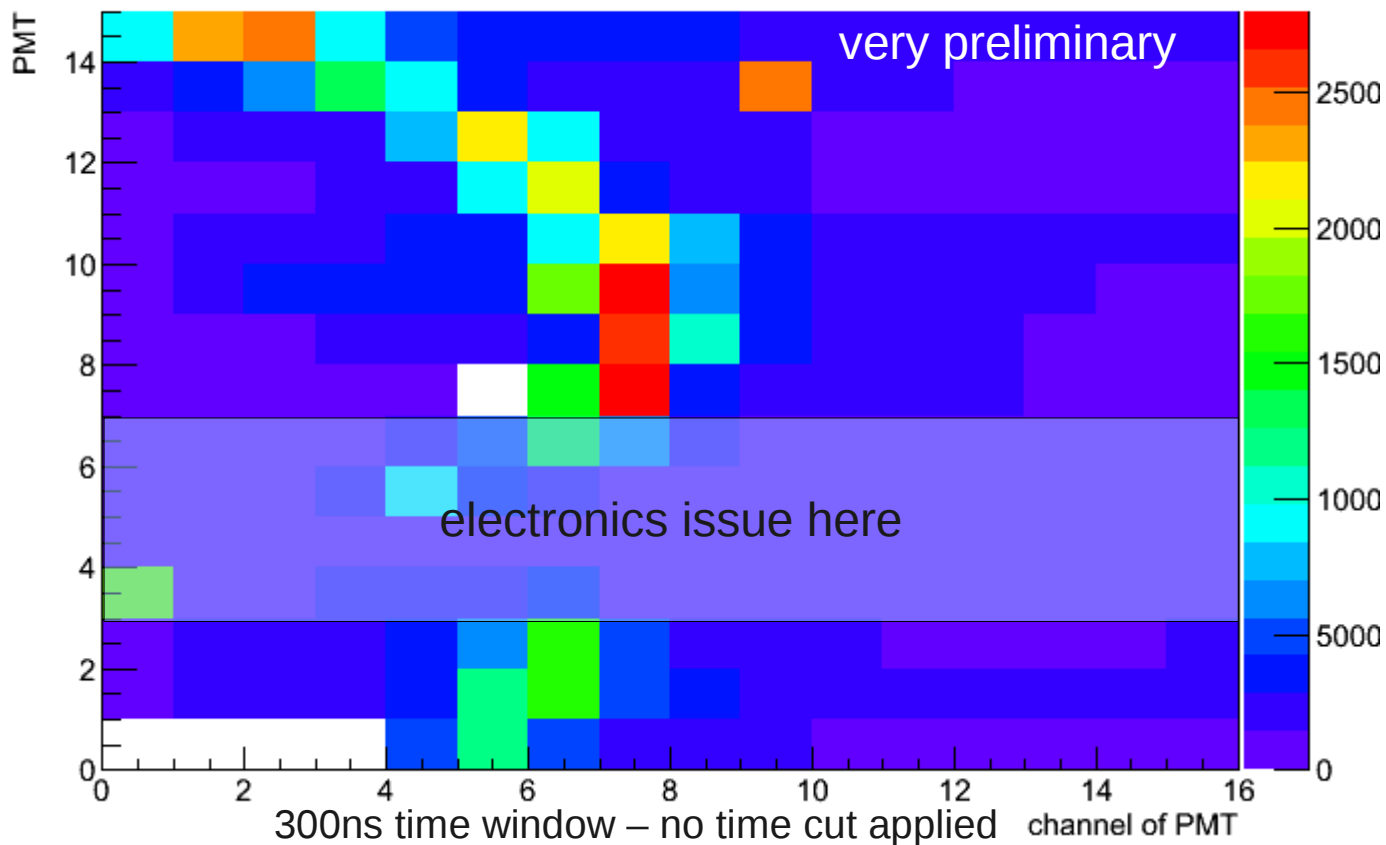
DESY June 2012



DESY June 2012

Online results

2DPlot - overview



non-testbeam related

quartz radiator plate

cosmics testbeam stand

Quartz radiator plate ordered

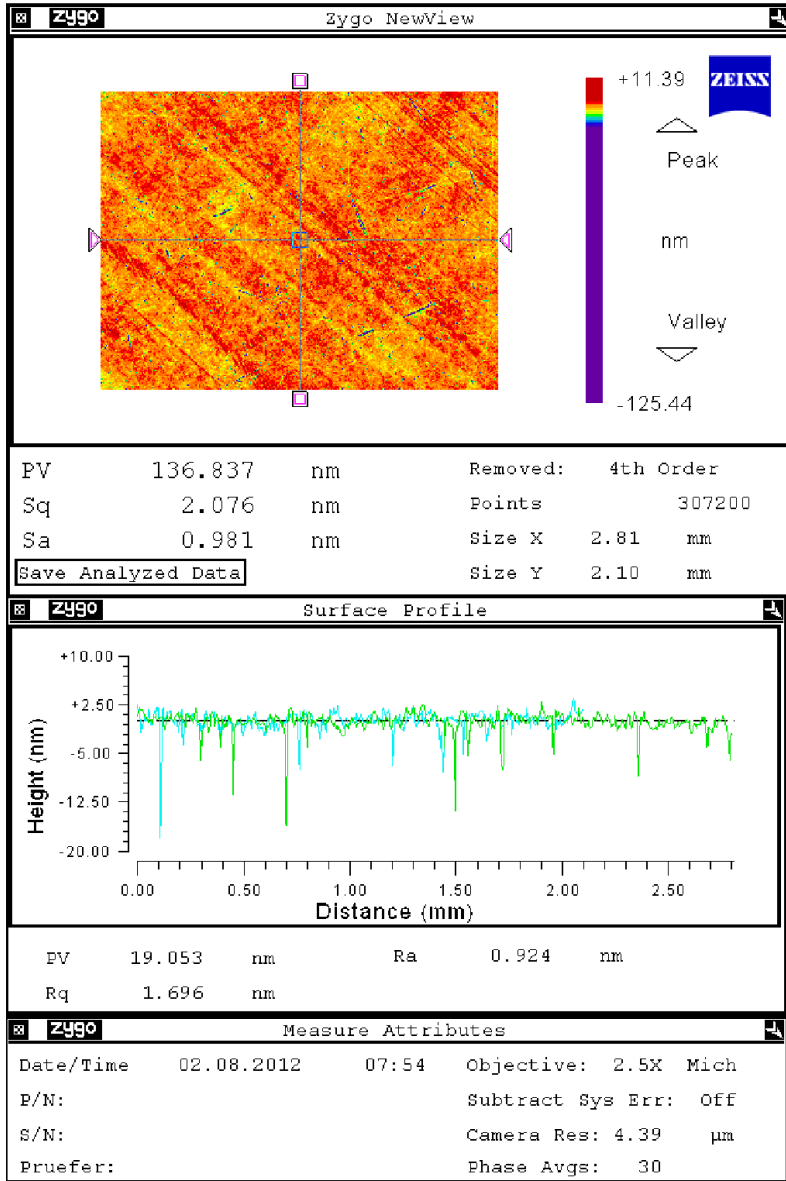
- 50cm x 50cm x 2cm
- Heraeus Spectrosil 2000
- side polish ZEISS Oberkochen
- optional large surface polish ZEISS
- each measurement costs money
- measurements may not be conclusive
 - mechanical deformation due to large 1:25 aspect
 - strong adhesion “ansprengen” if two polished sides come into contact
 - tactile measurement finger exerting force ~20g
- interferometric thickness determination
- RMS surface roughness
 - possibly wedge measured – thickness at location of three support blocks “Endmaße”



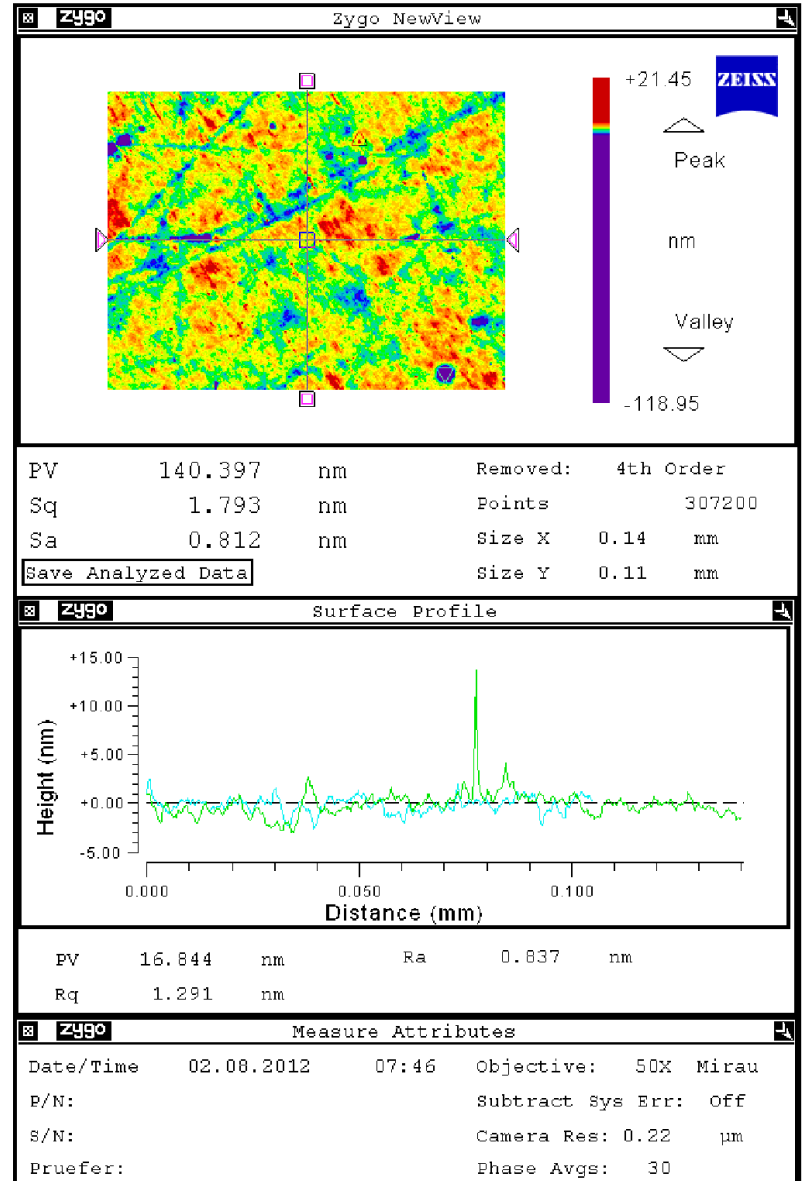
RMS “Mikrorauhigkeit”

640 x 480 pixels

example measurement on random workpiece,
polishing work in progress, early stage

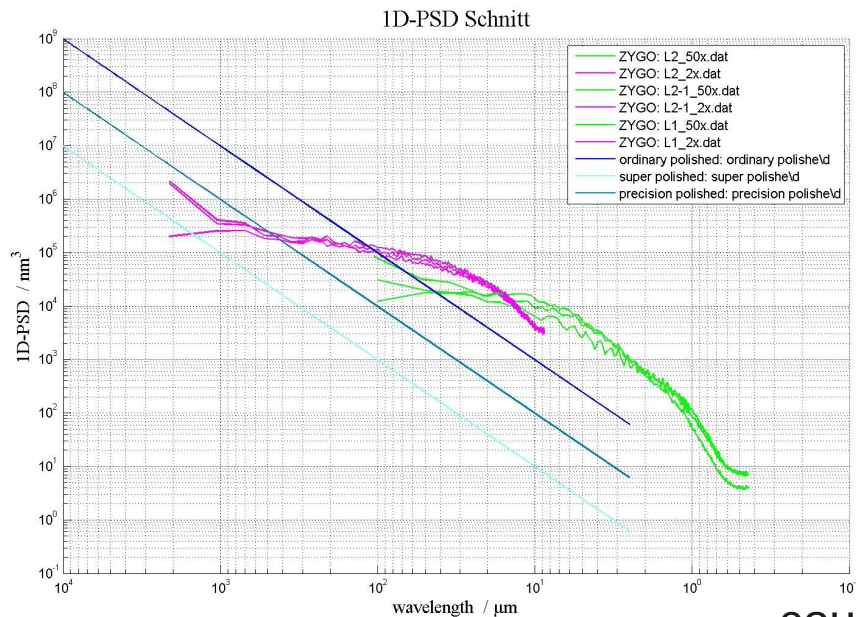


covering “only” 2.5 orders of magnitude
in spatial frequency range (DIRC 3.5-4)

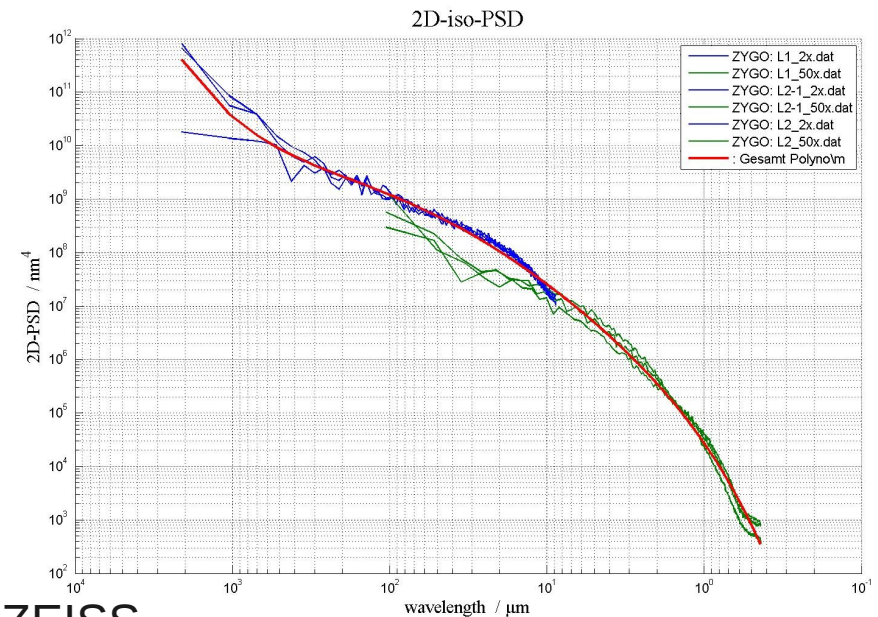


PSD : Power-Spectral-Density curves

- different slopes weighting in spatial frequency space
- “analyse in x, then add in y” prescription only taking info along one coordinate, possibly projecting in frequency space (moving strength to different $|k|$ in discarding y component)



courtesy ZEISS



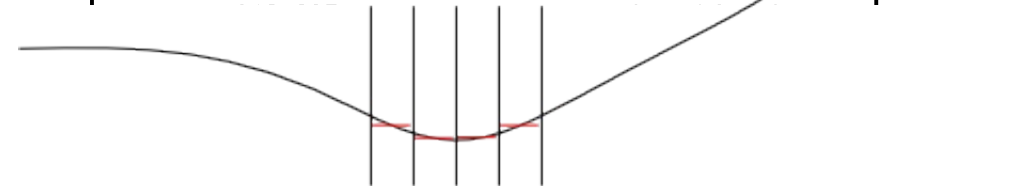
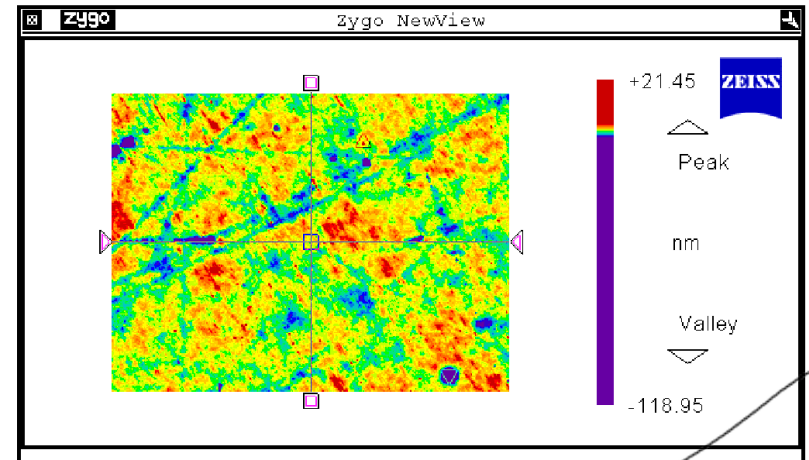
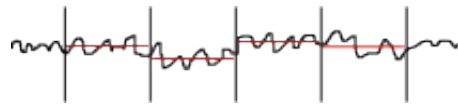
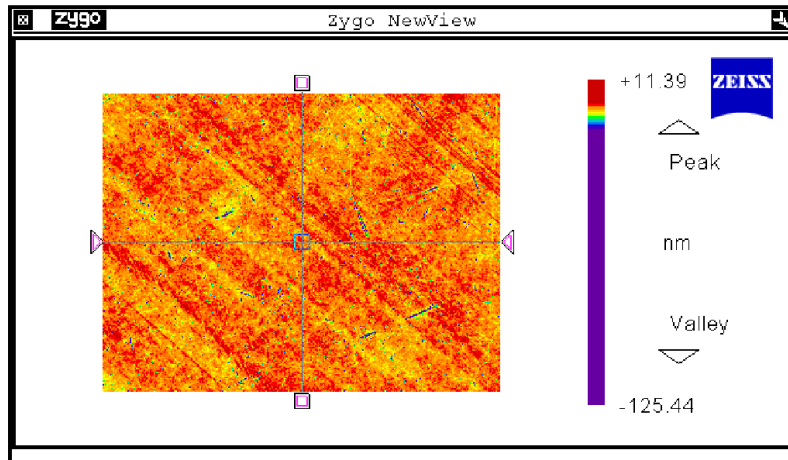
- PSD curves to be k -weighted (k or k^2) before integration to arrive at meaningful RMS value for our DIRC roughness

RMS roughness value

lessons for me (for us)...

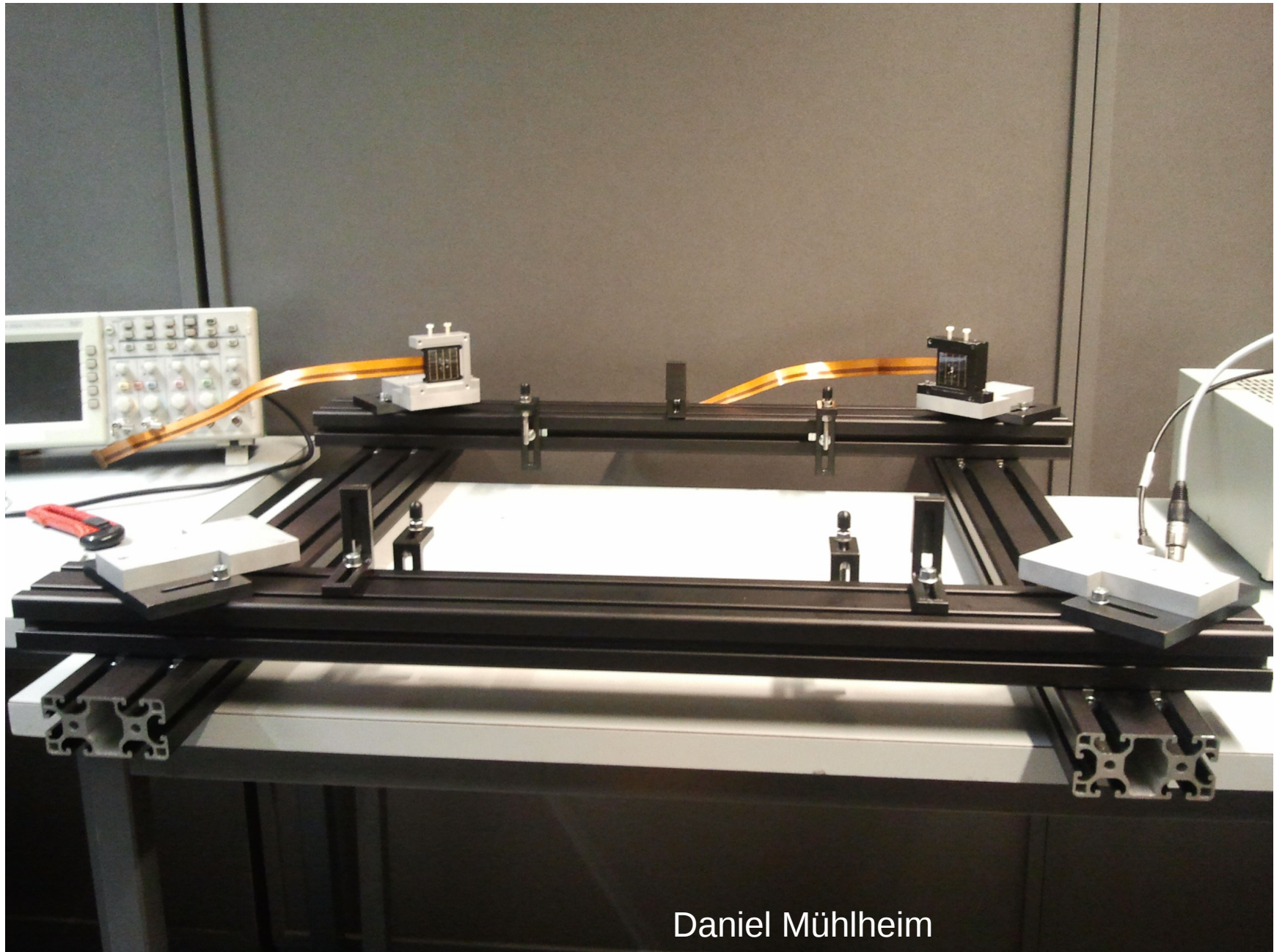
- RMS specification only meaningful when the spatial frequency bandwidth is provided or a measurement prescription is given
- values from RMS measurements on DIRC radiators (using scalar scattering theory formula) will be dependent on incident light angle and wavelength (colour → spatial frequency range)

RMS “Mikrorauhigkeit”

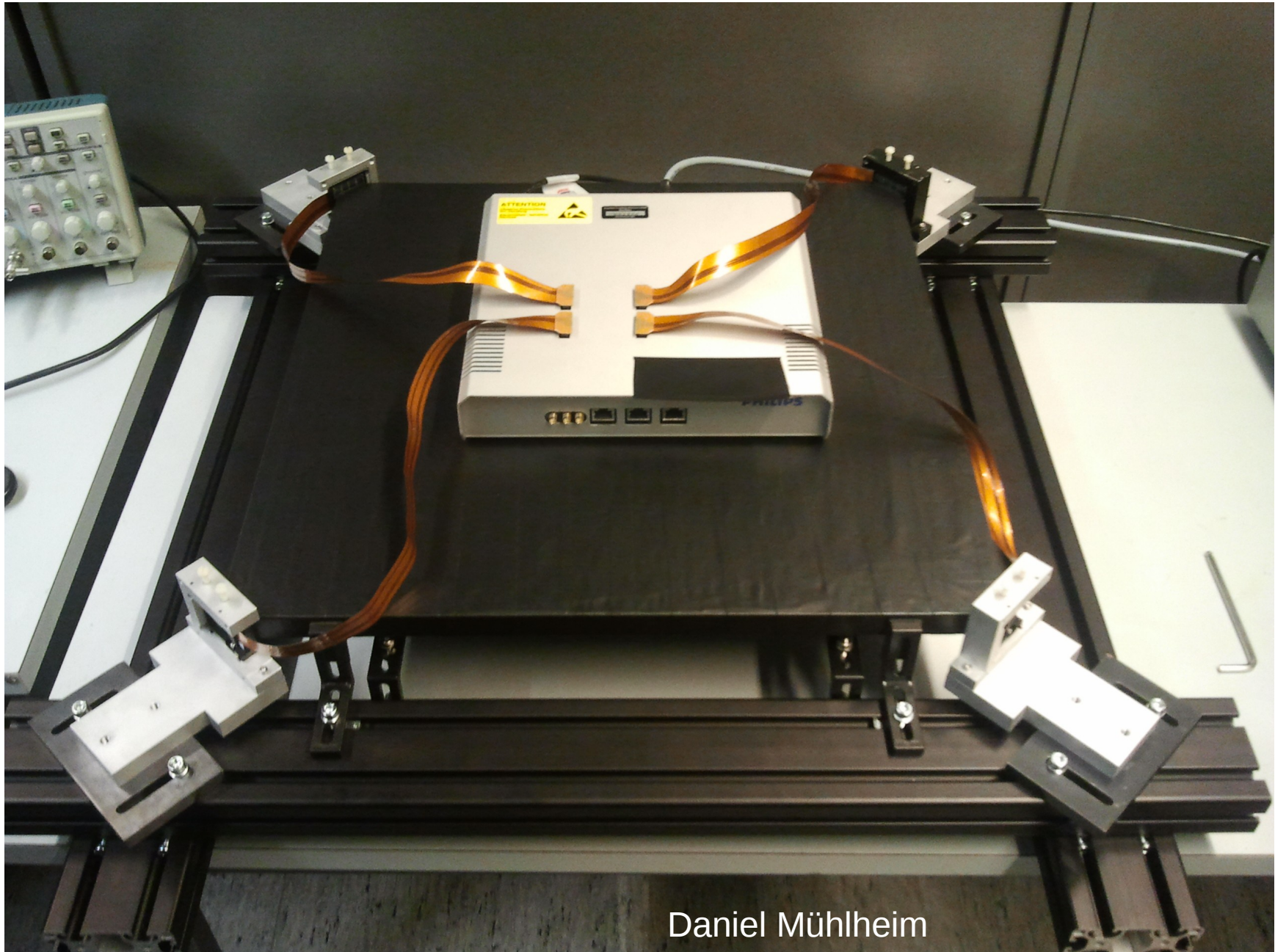


- limited bandwidth of individual measurement
- but direct interferometer results are closer to roughness effects for DIRC surface reflectivity
- RMS “safety margin” suggested in discussion

Cosmics testbeam stand 1



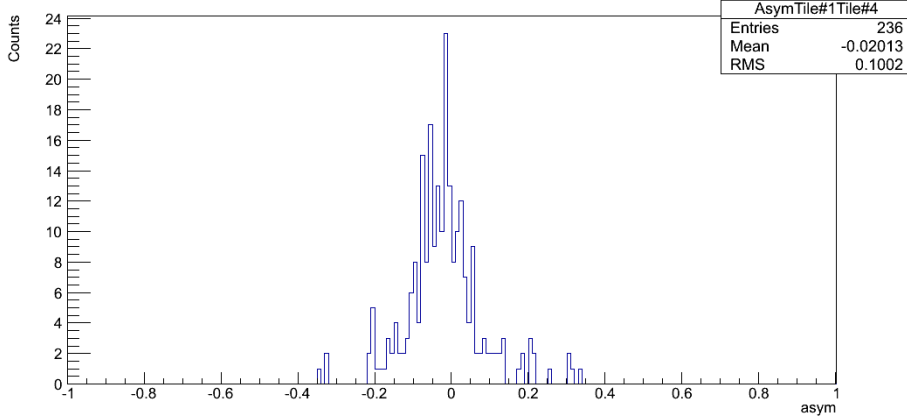
Cosmics testbeam stand 2



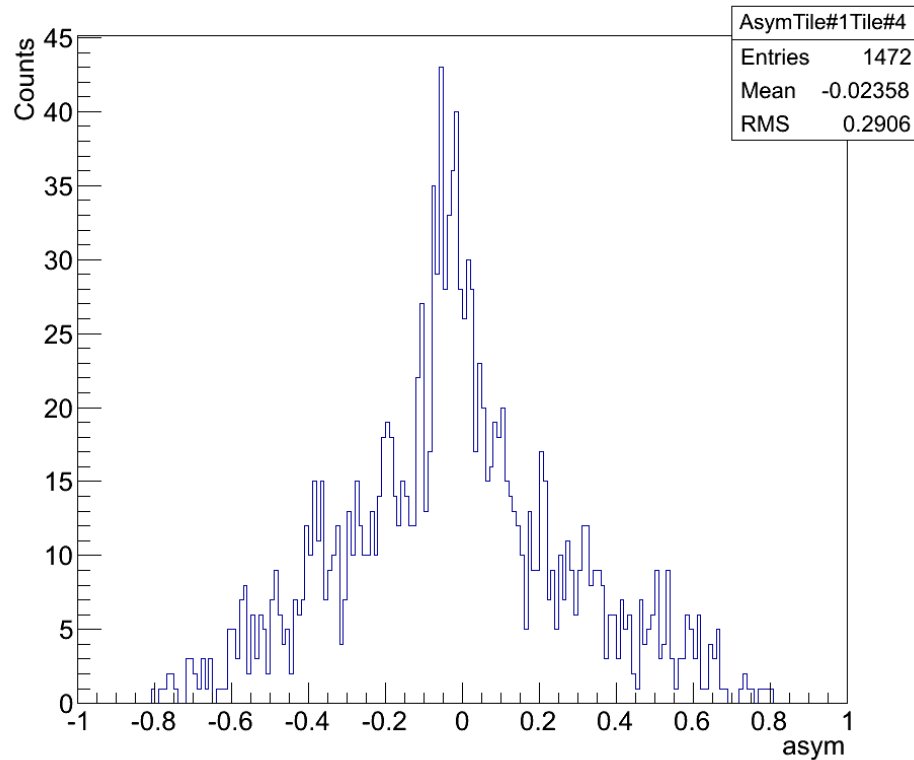
Daniel Mühlheim

Cosmics testbeam stand 3

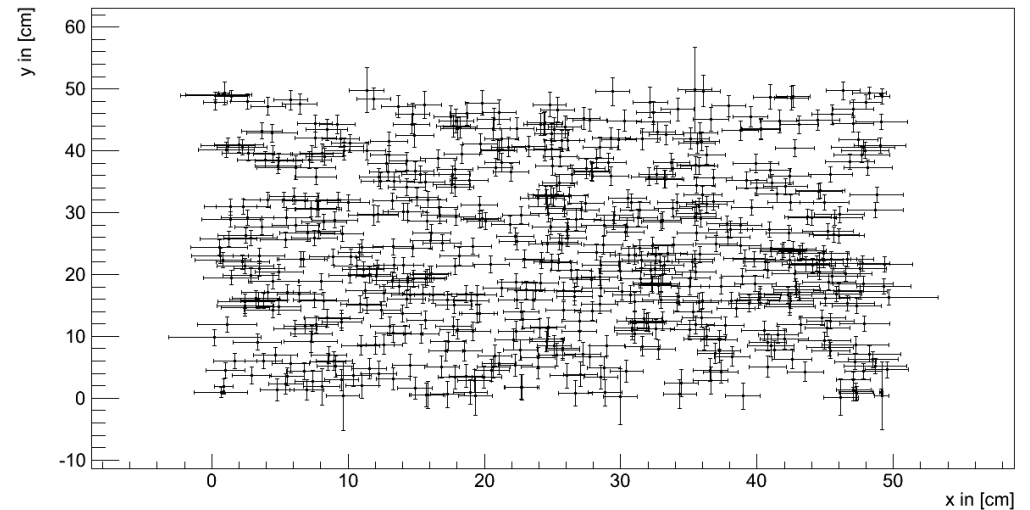
AsymTile#1Tile#4



AsymTile#1Tile#4

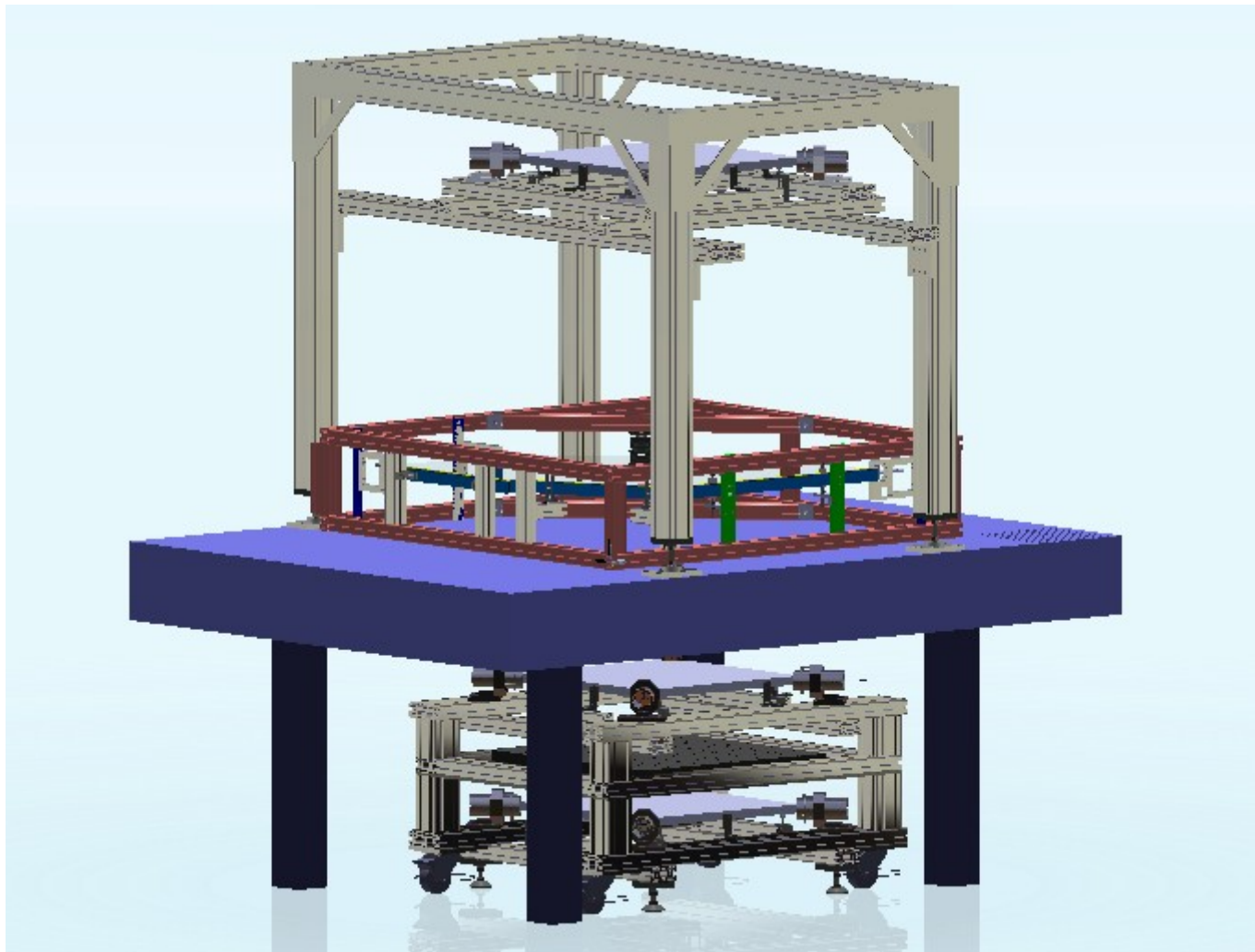


Reconstructed positions



- reconstructed event positions
- using #photons (~amplitude)
 - time differences not used yet

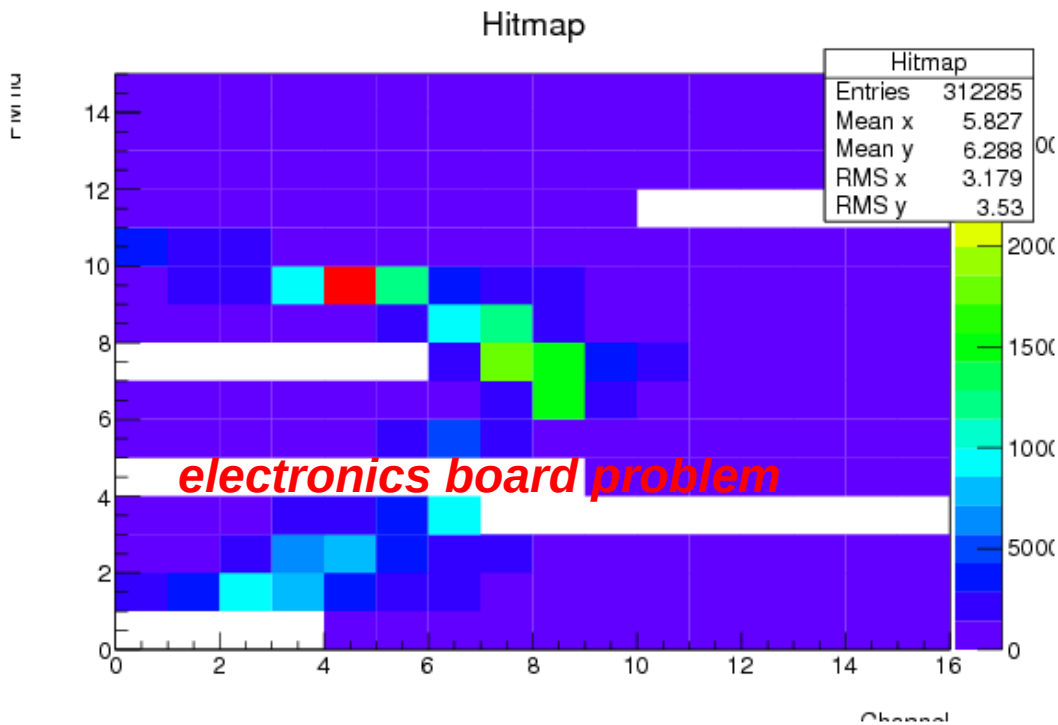
Cosmics testbeam stand 4



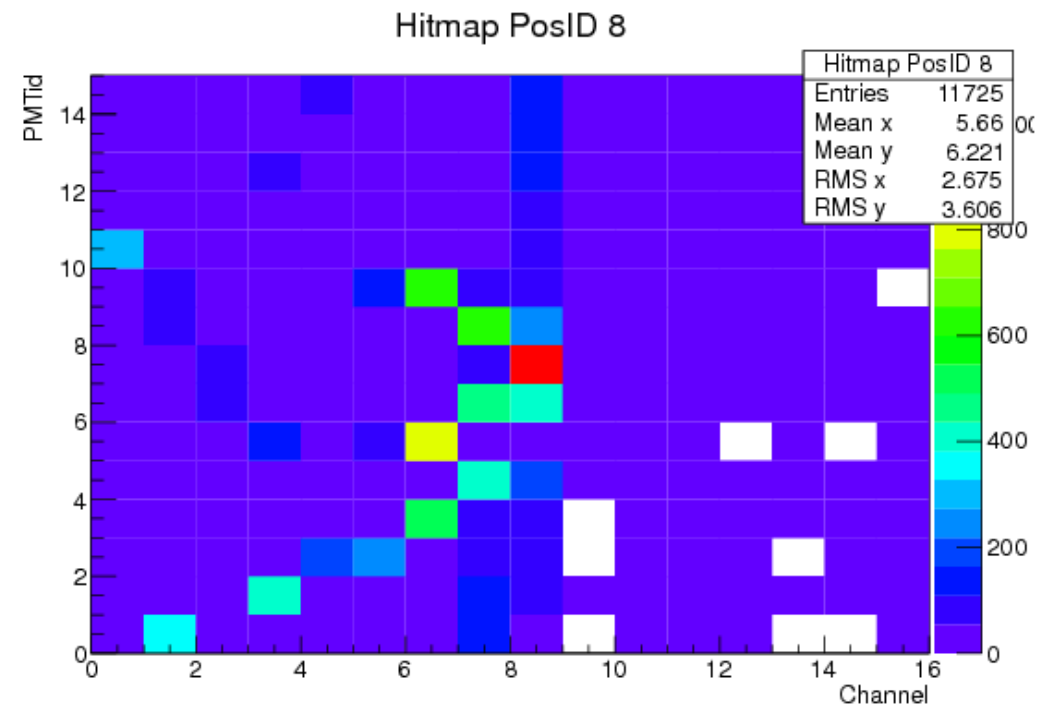
learning from DESY in June 2012

preparing for CERN September testbeam

Understanding photon patterns



experiment (with time cut)

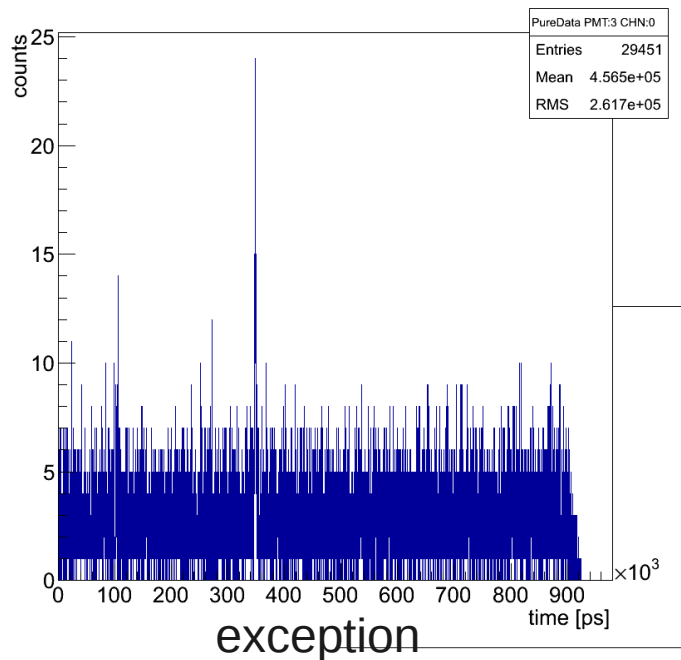
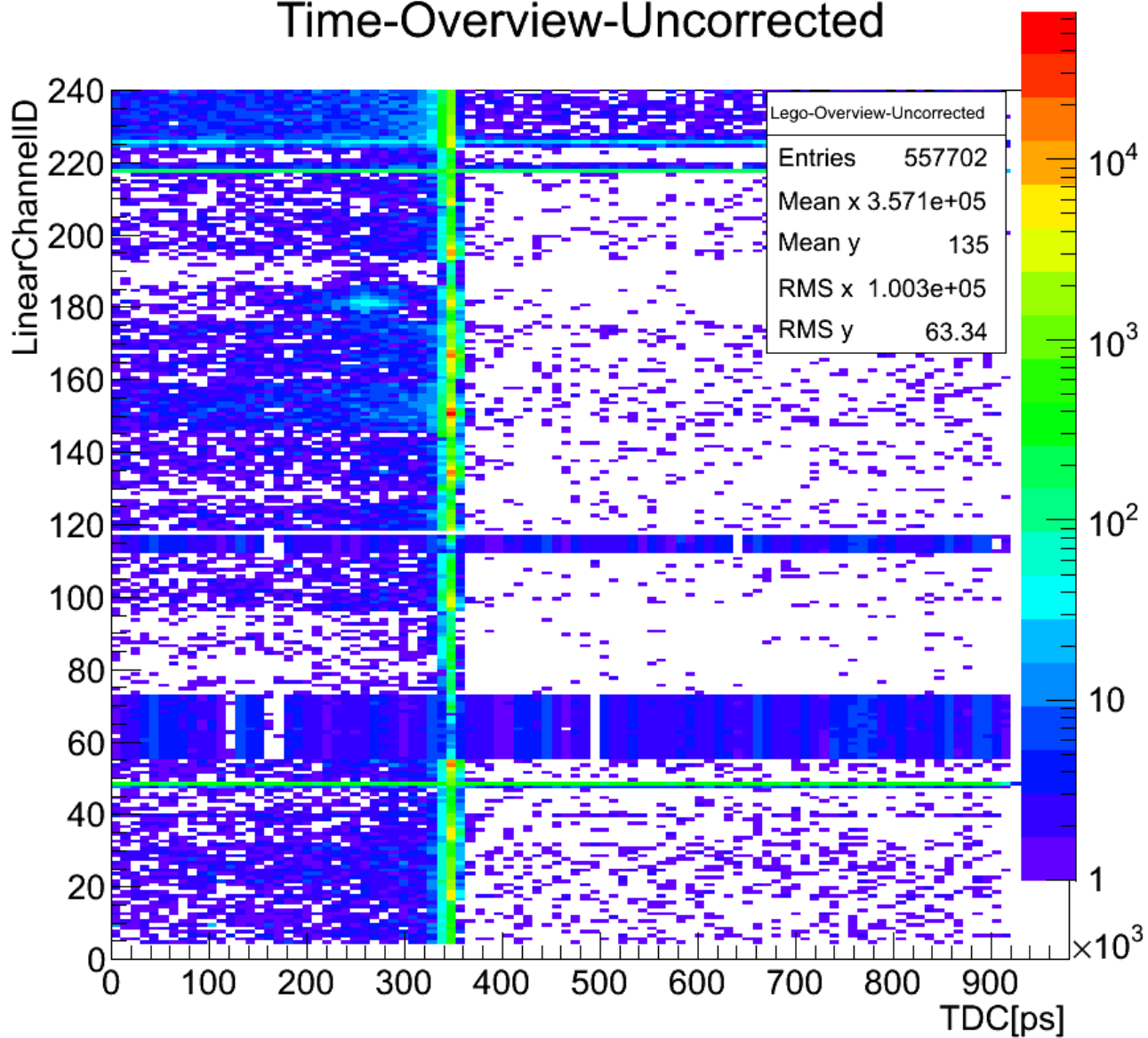


simulation

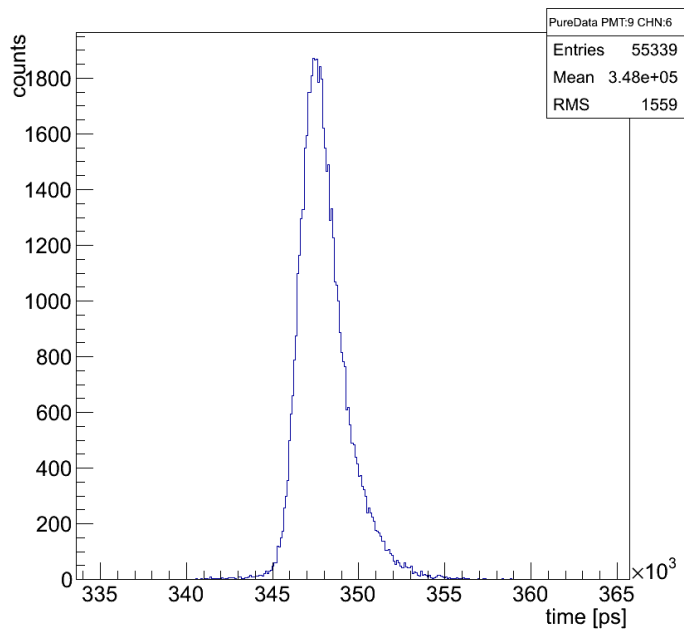
Timing spectra

log scale

Time-Overview-Uncorrected



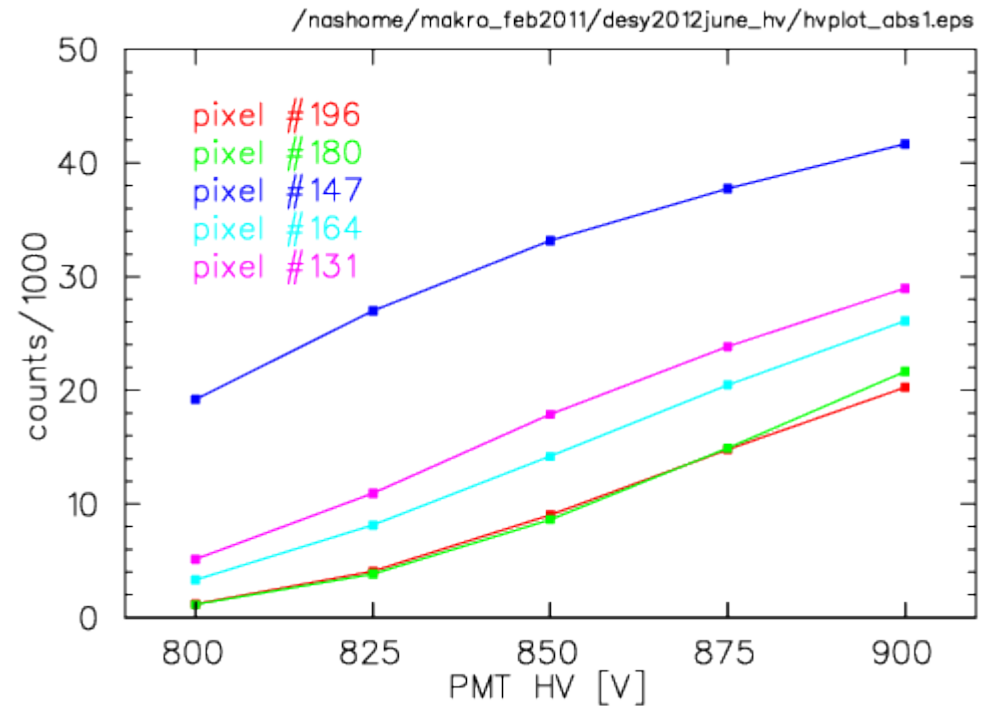
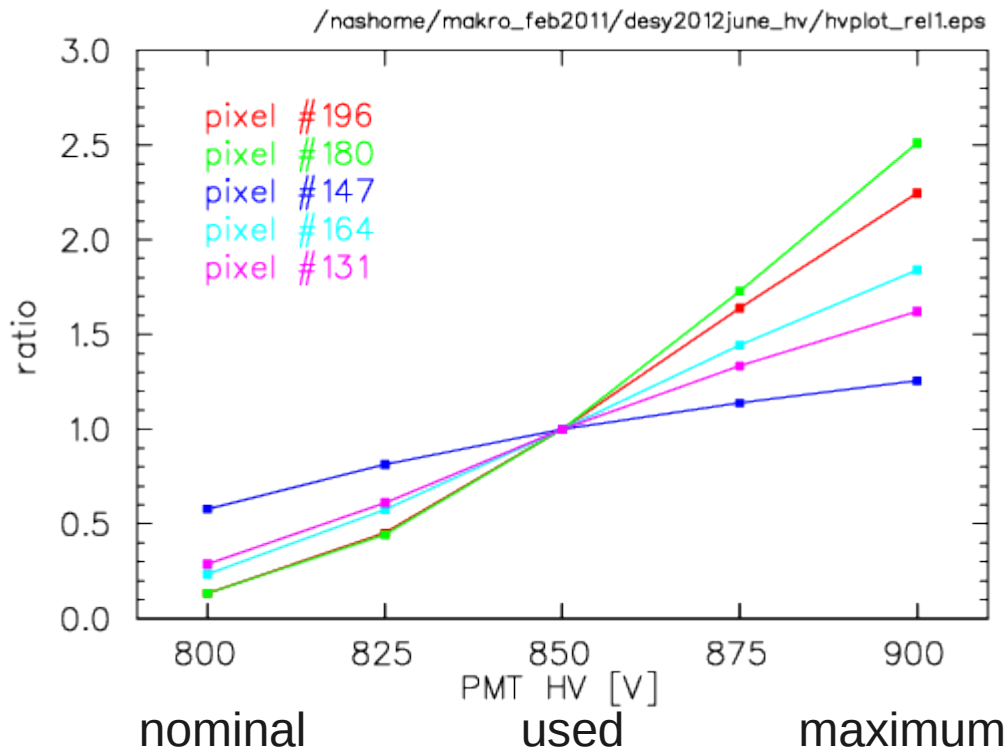
exception



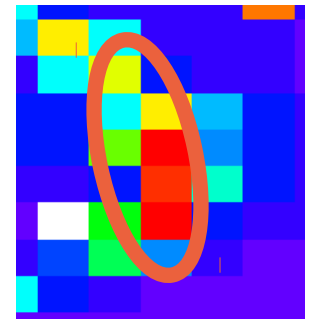
typical timing (uncorrected)

PMT HV scan

- threshold setting mainly noise-free



- pixels chosen from Cherenkov image trace
- plateau of constant efficiency not yet reached

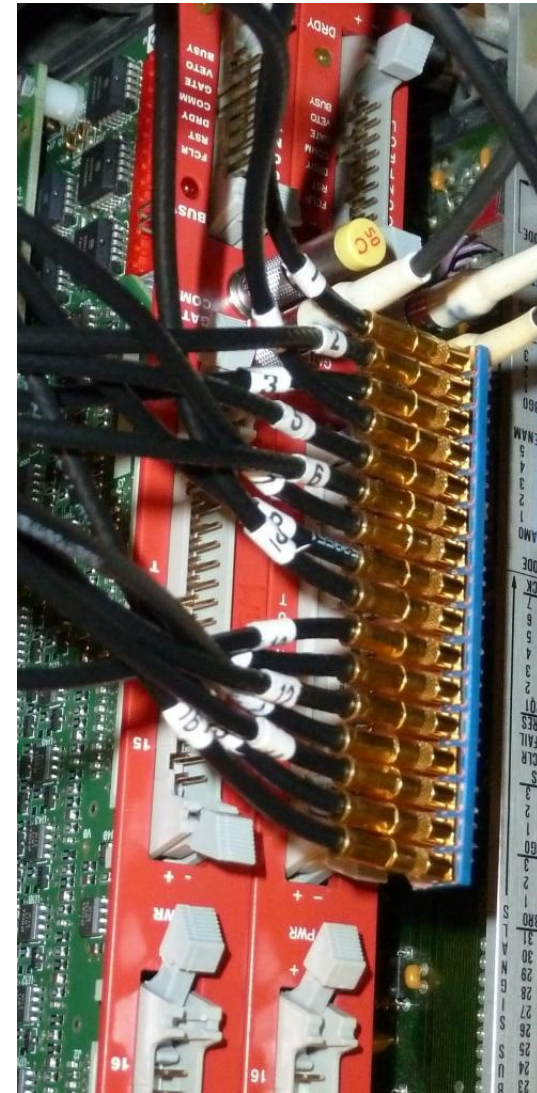
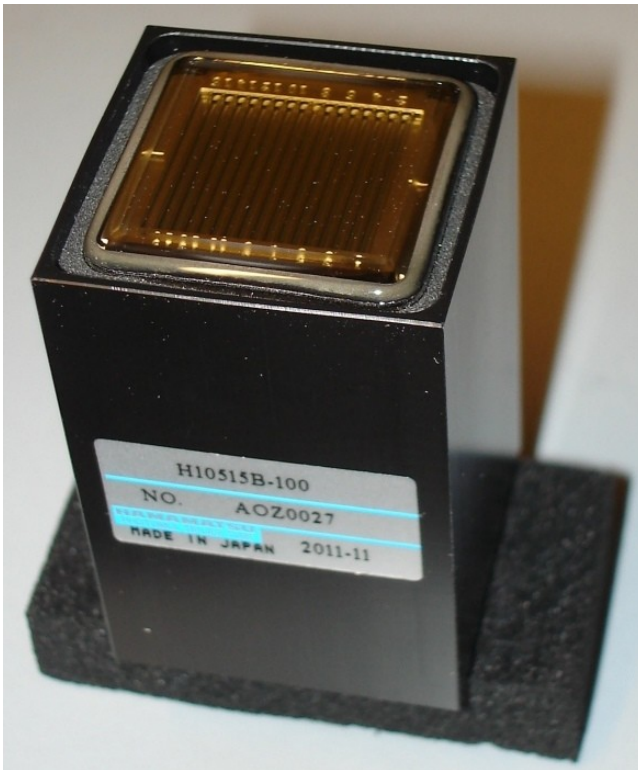


PMT test stand 1

Julian Rieke



PMT test stand 2



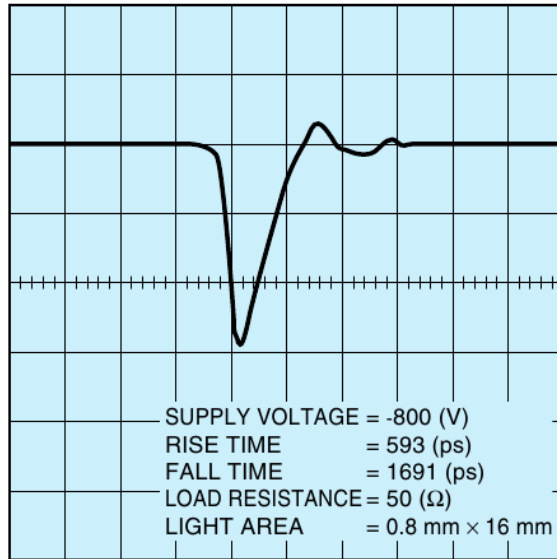
Julian Rieke

PMT test stand

H10515B Series

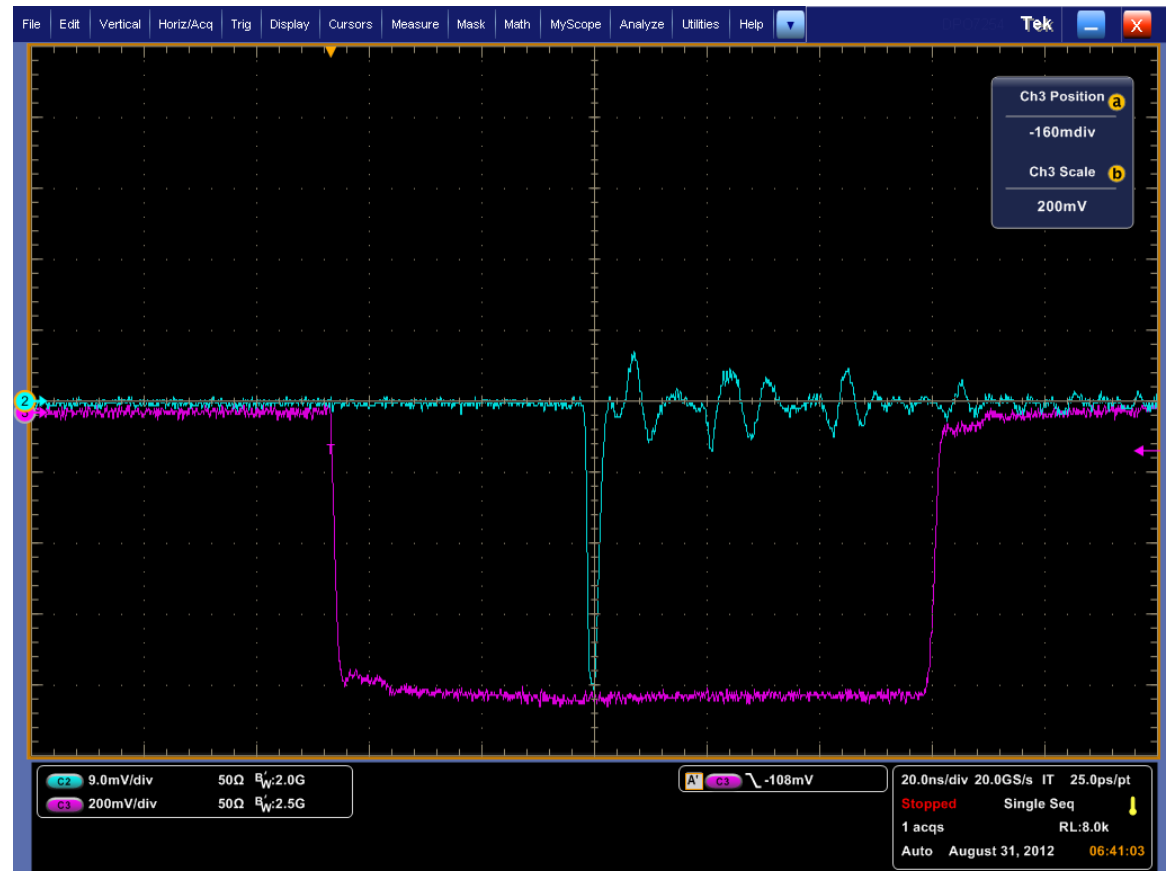
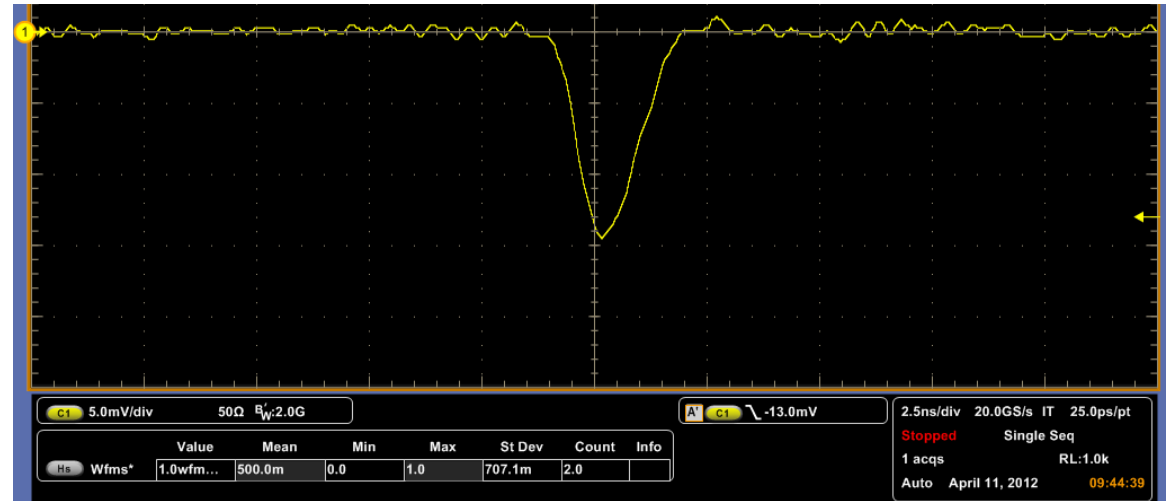
TPMHB0320EB

5 (mV/div.)

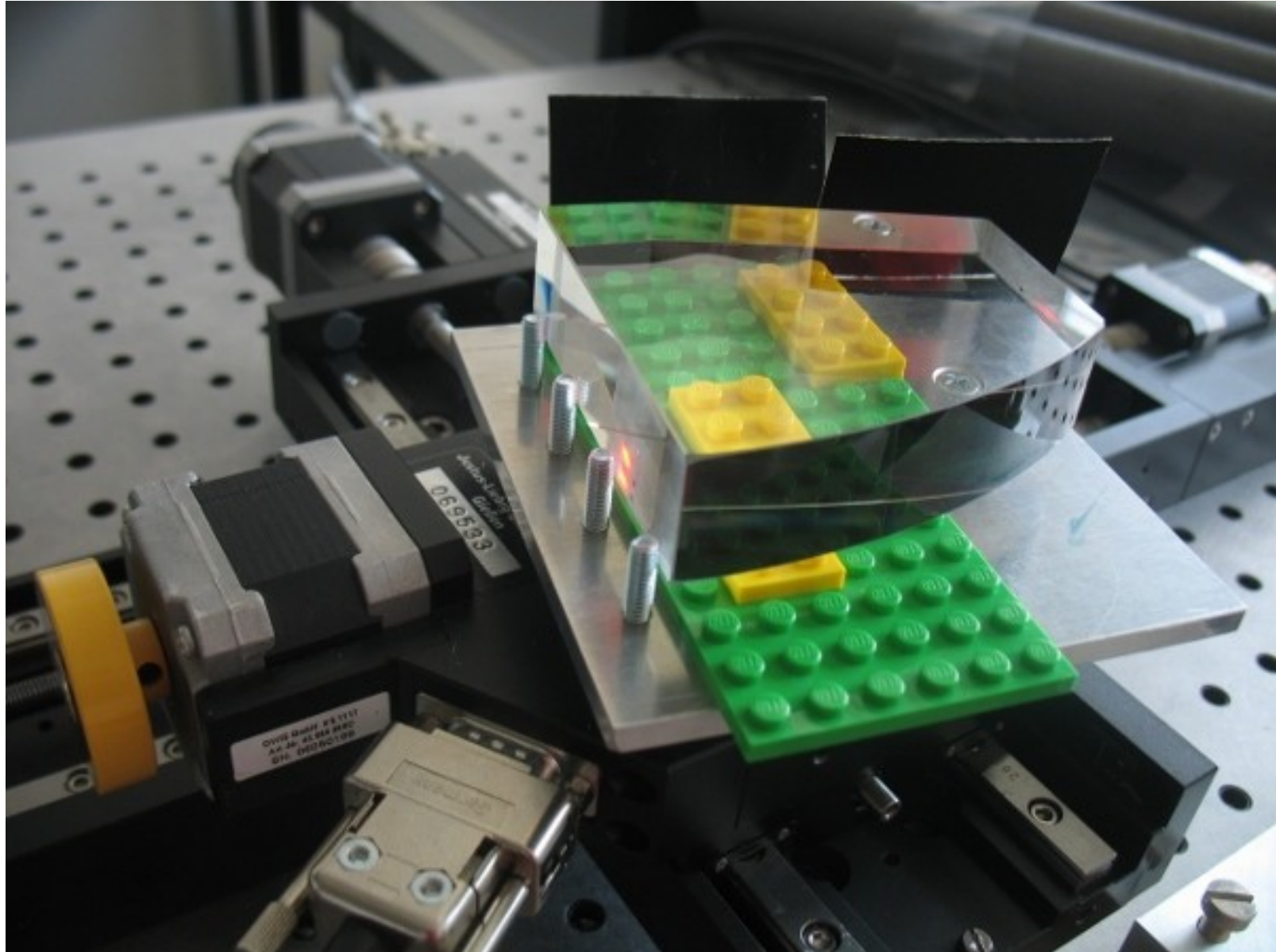


2 (ns/div.)

Julian Rieke

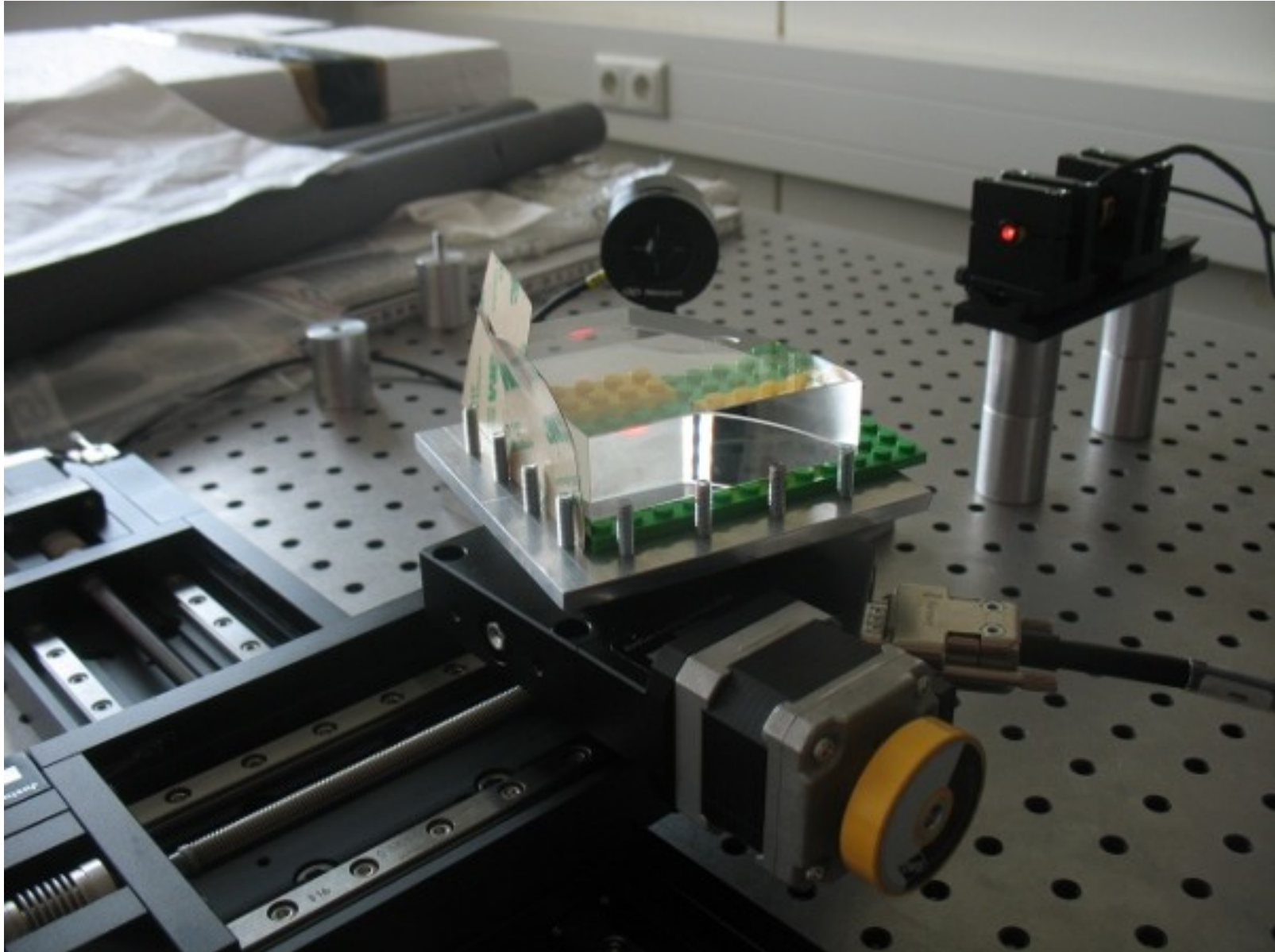


FLG surface roughness 1



Alexander Becker

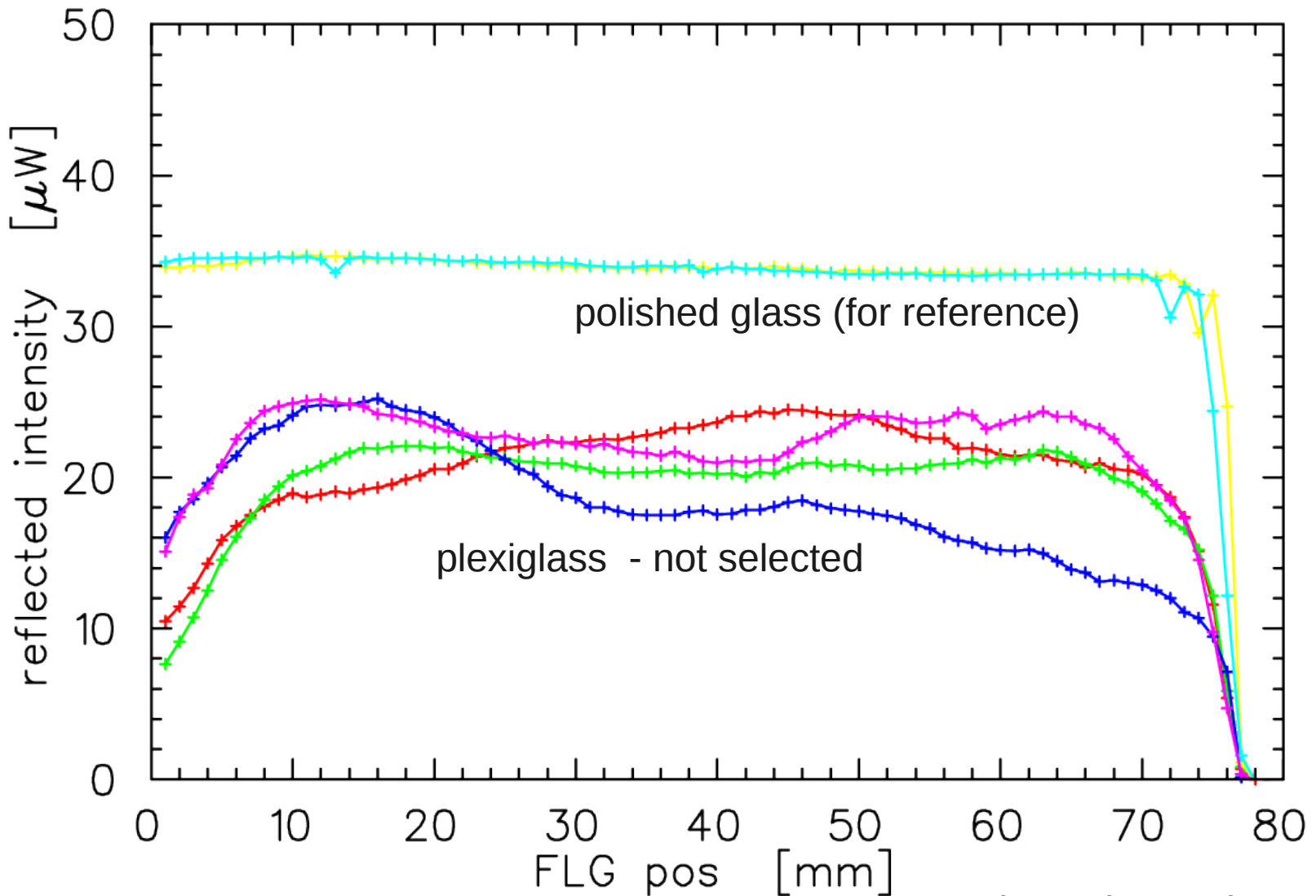
FLG surface roughness 2



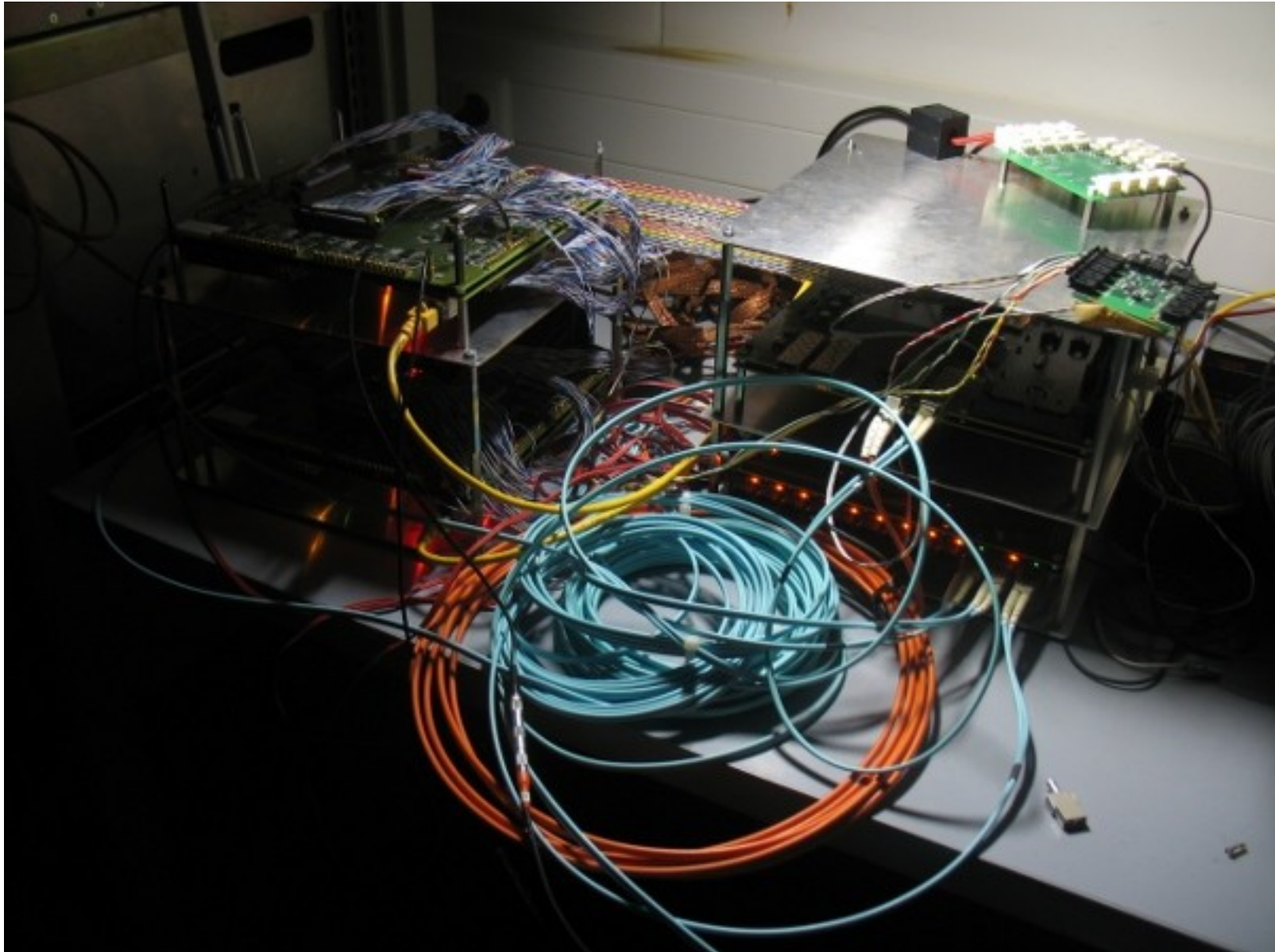
Alexander Becker

FLG surface roughness 3

25 (or 30) PMTs to be used in the CERN testbeam time
==> extra mechanics and FLGs have been machined

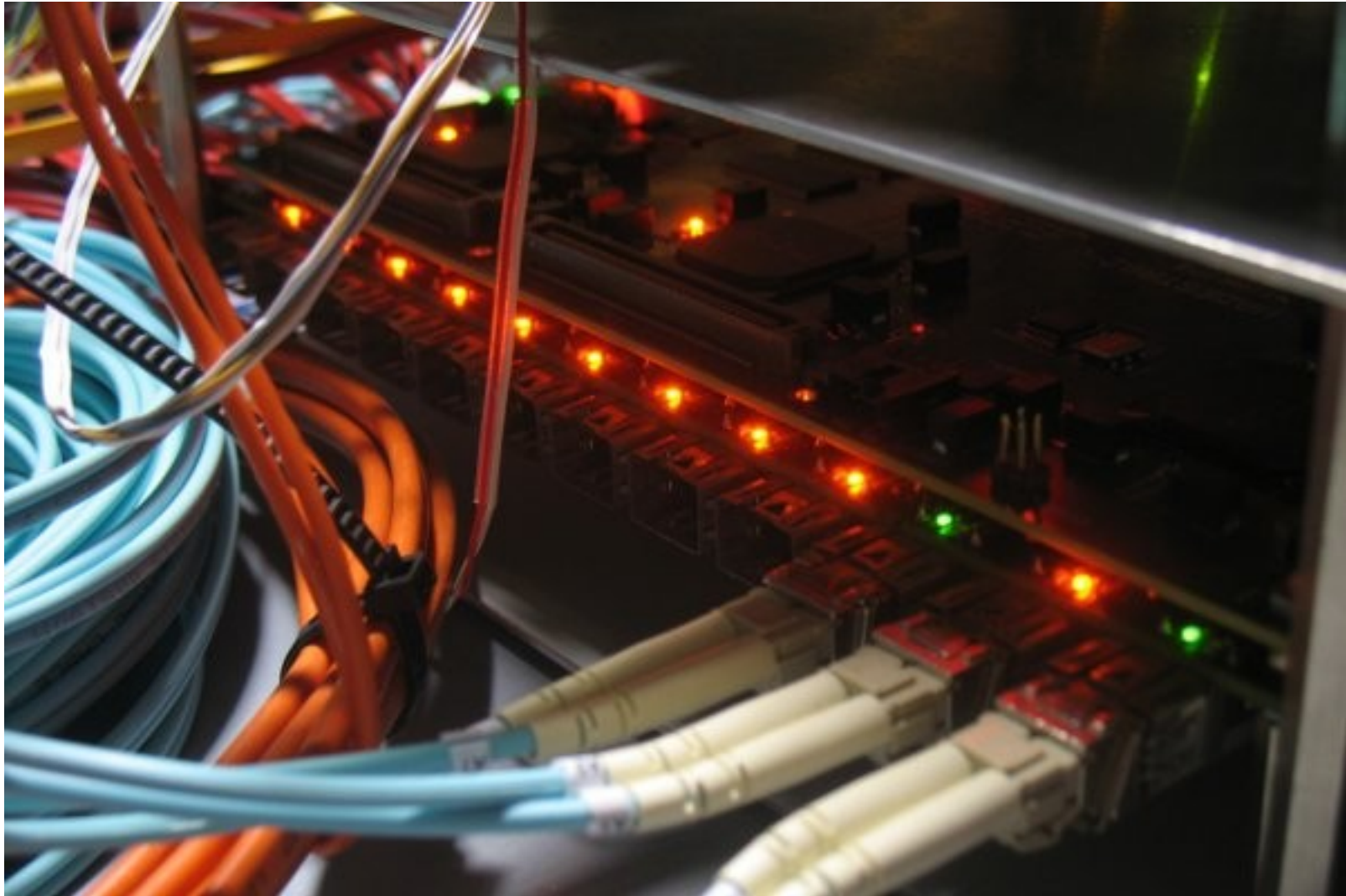


DAQ



Benno Kröck

DAQ



understanding the TRB boards and the issue of setting proper thresholds

Benno Kröck

merci pour votre attention

