Crystal Collimation Workshop,
CERN, 25-27 October 2010

SPS session

Cherenkov detectors in UA9

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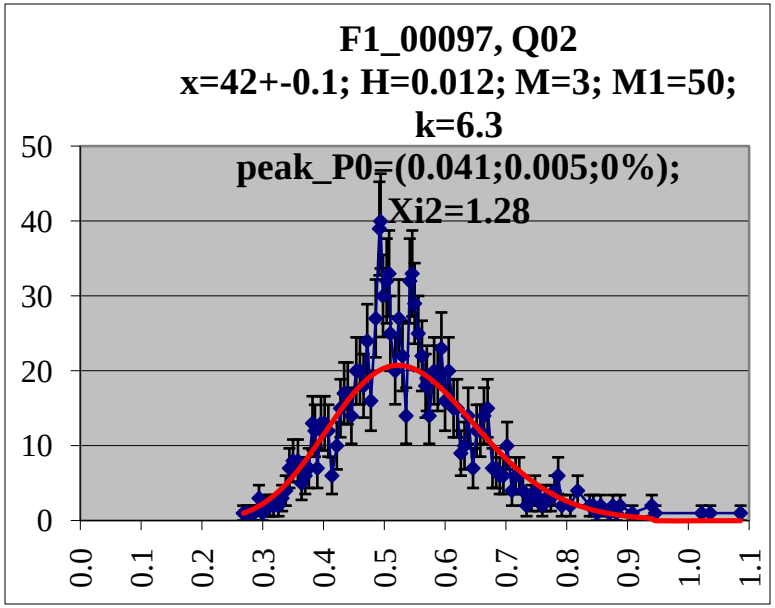
Milestones

- February 2009 – proposed to install Cherenkovs in SPS
- March 2009 – fabricated, tested and the first installed in Absorber
- April 2009 – first signals observed during SPS operation
- May 2009 – the second Cherenkov installed in CERN tank
- June 2009 – first data from Cherenkovs
- August 2009 – signals synchronized with SPS cycle
- September 2009 – calibrations on H8
- November 2009 – amplitudes recorded during MD on 4th Nov
- January 2010 – the third Cherenkov installed in Dispersive area
- July, Sept, Oct 2010 – UA9 runs in SPS

Quartz, Lihgt channel, PMT

Spectrum from Cherenkov radiator when quartz close to PMT through silicon paste

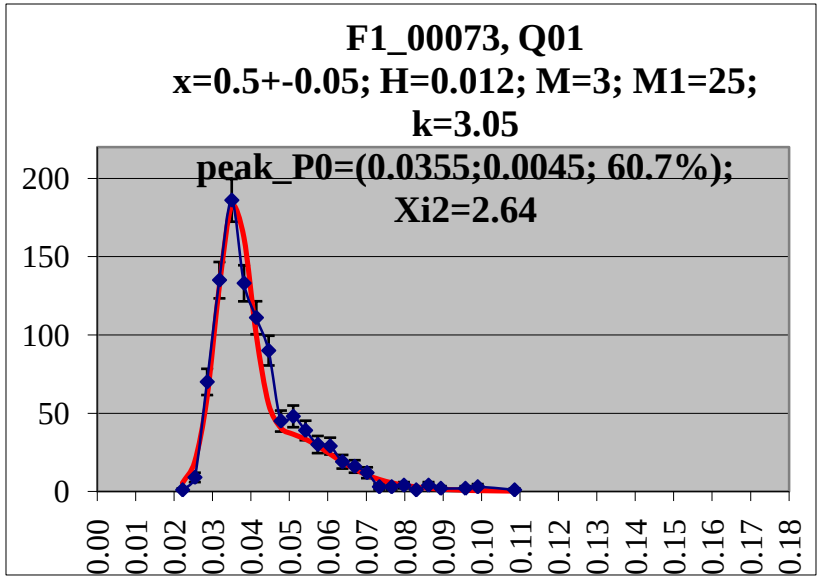


Mean number of electrons per incident proton **~ 40**

One electron amplitude **~ 10 mV**

Cherenkov efficiency **= 100%**

Spectrum from Cherenkov radiator when quartz and PMT on a distance 12 cm

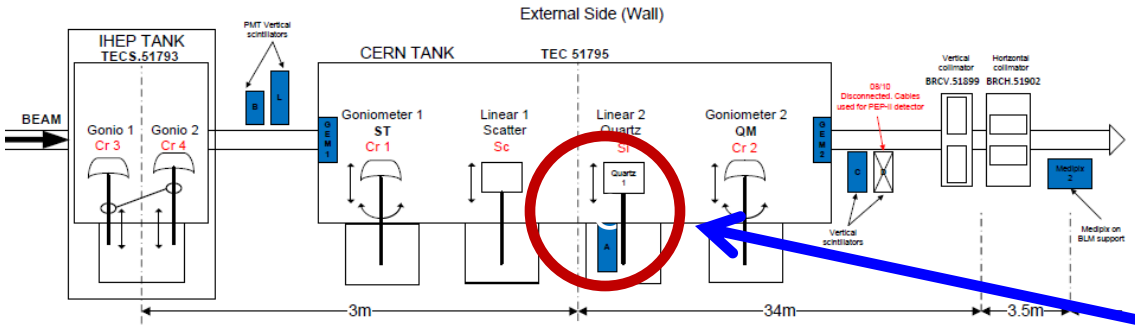


Mean number of electrons per incident proton **~ 0.5**

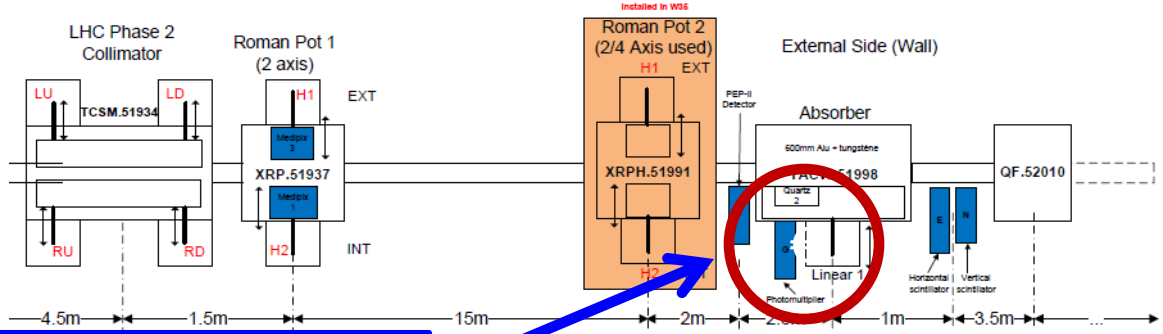
One electron amplitude **~ 10 mV**

Cherenkov efficiency **= 40%**

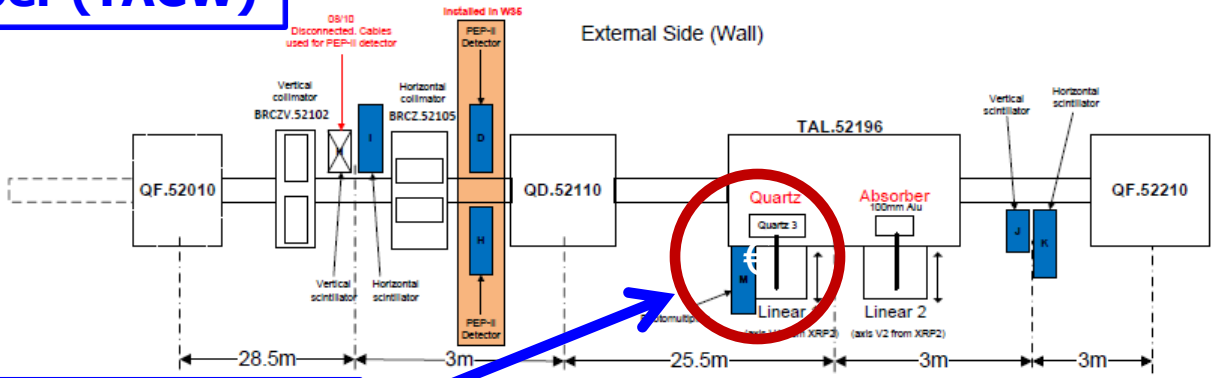
Layout of Cherenkov detectors in UA9



Cherenkov in CERN tank

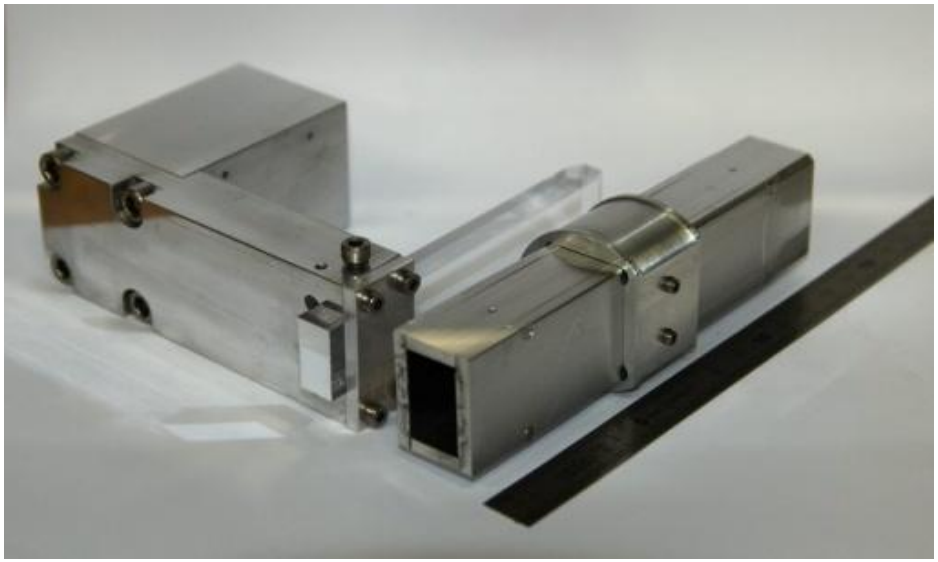


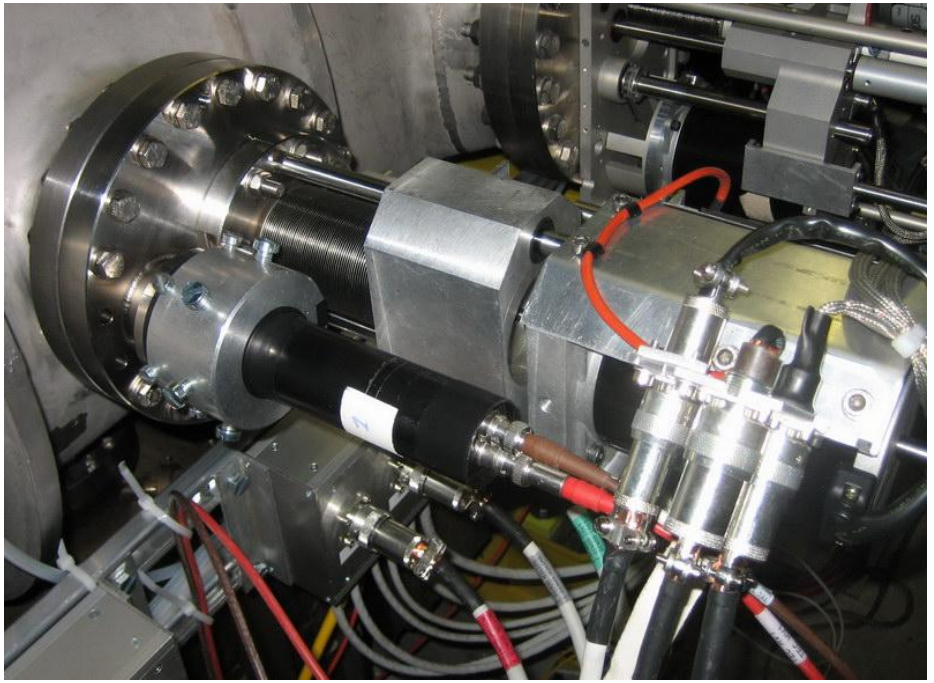
Cherenkov in Absorber (TACW)

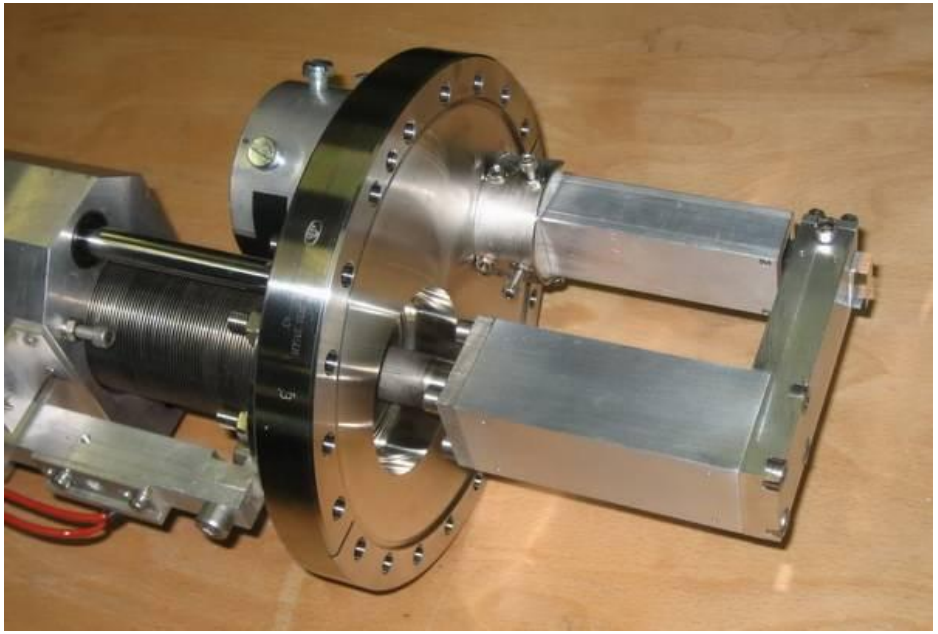


Cherenkov in Dispersive Area (TAL2)

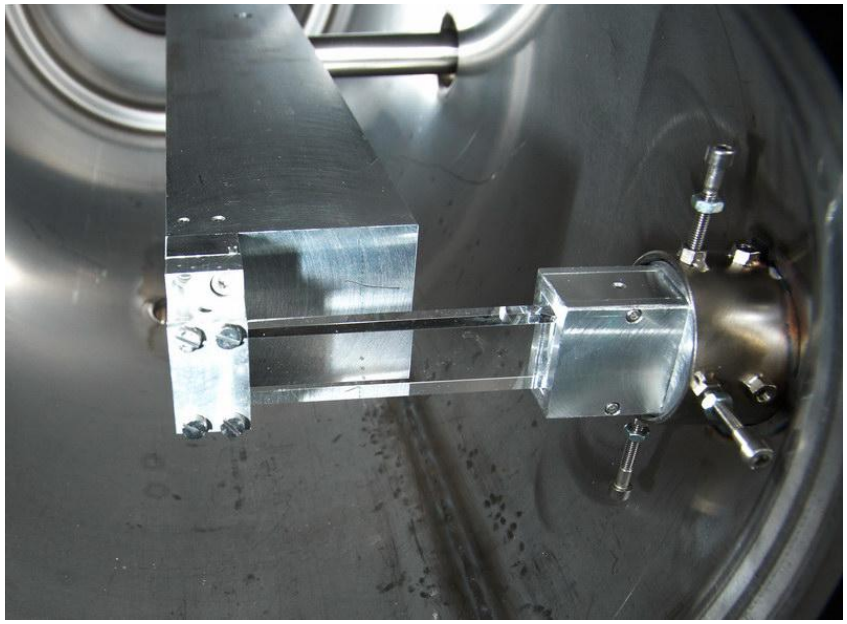
Cherenkov in CERN tank

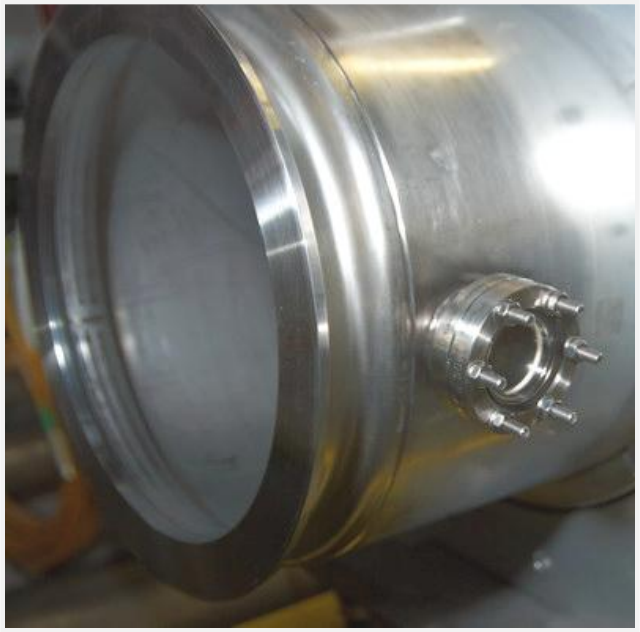


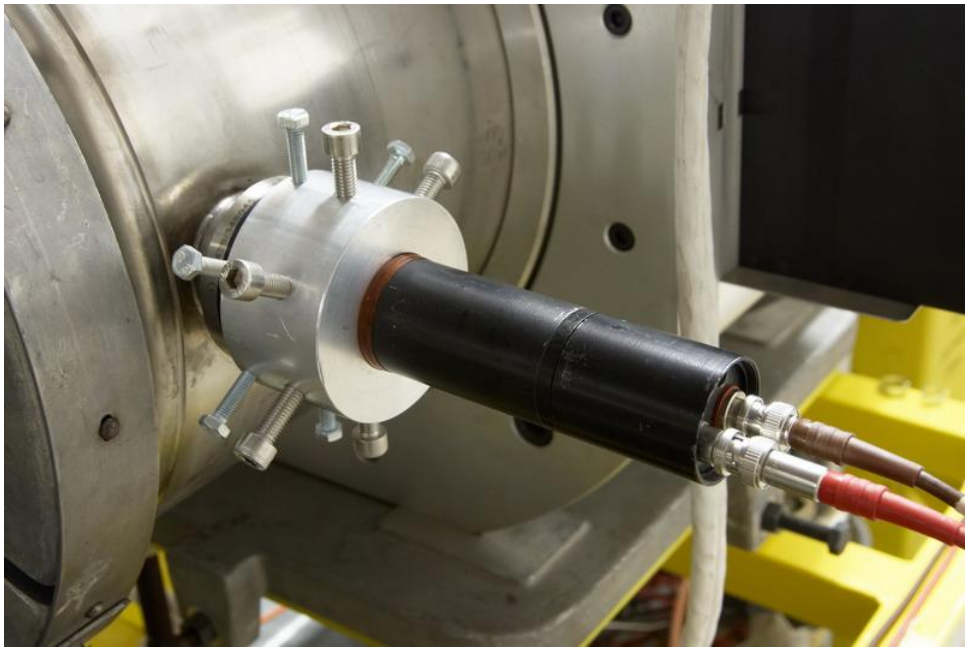




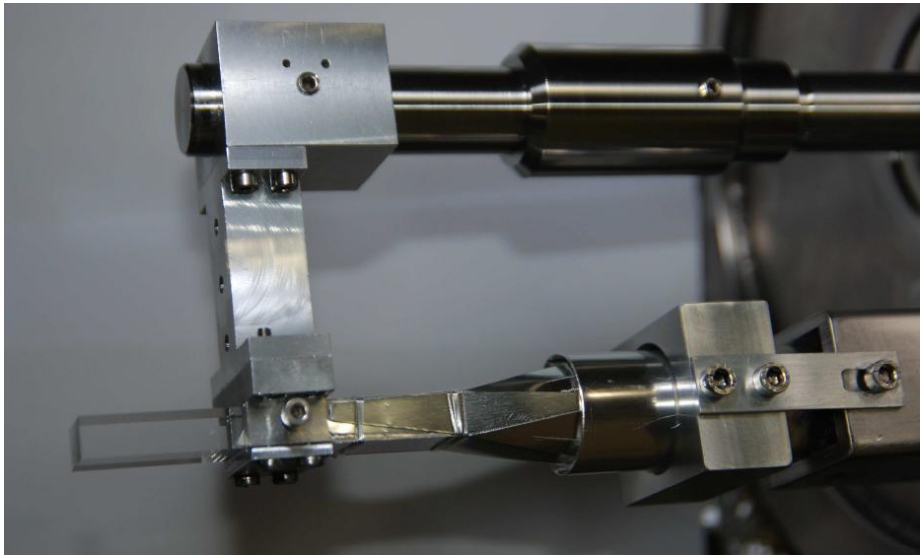
Cherenkov in Absorber (TACW)

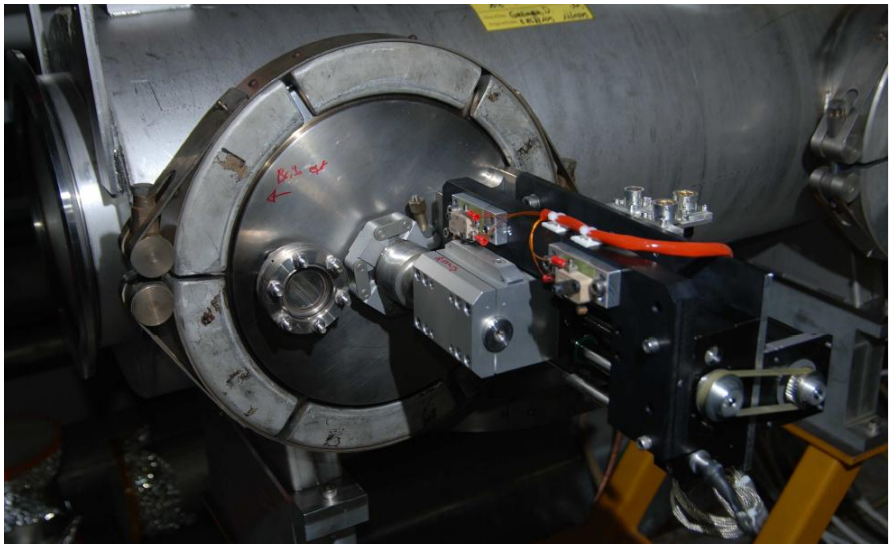


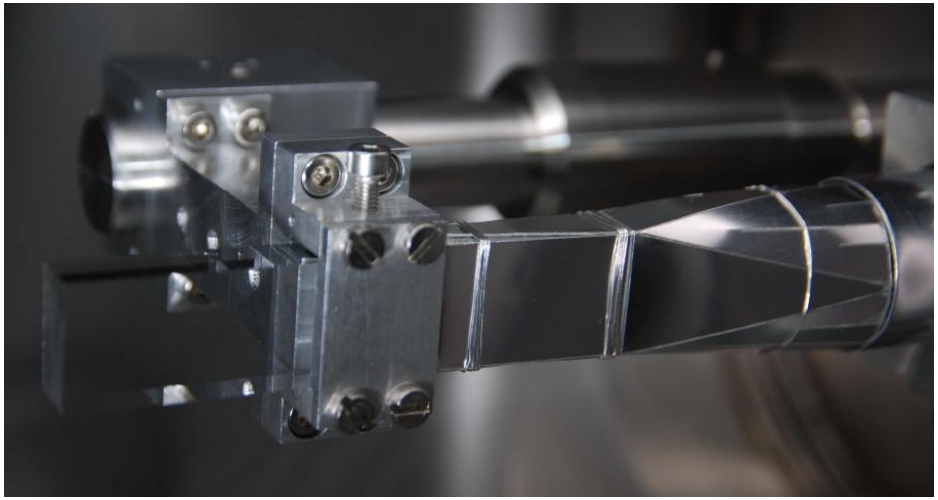


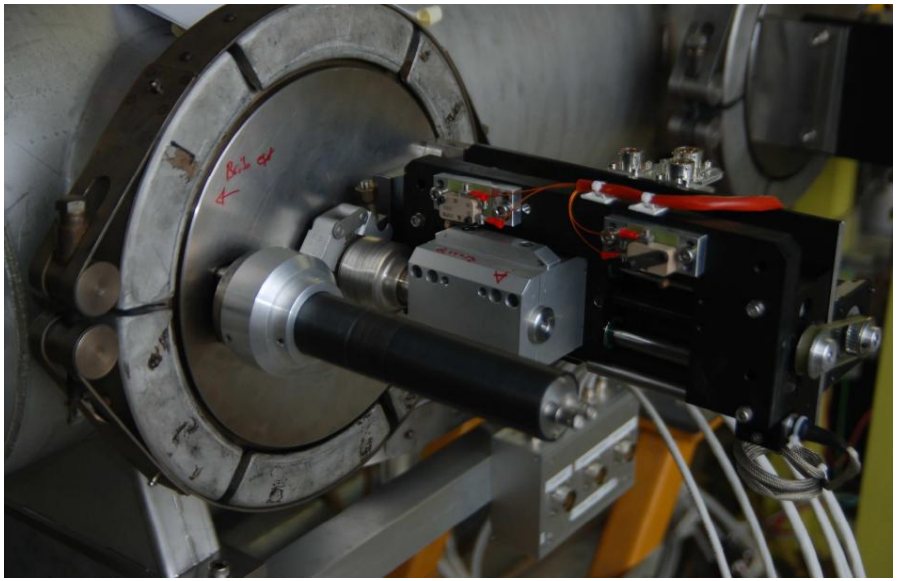


Cherenkov in Dispersive area (TAL2)

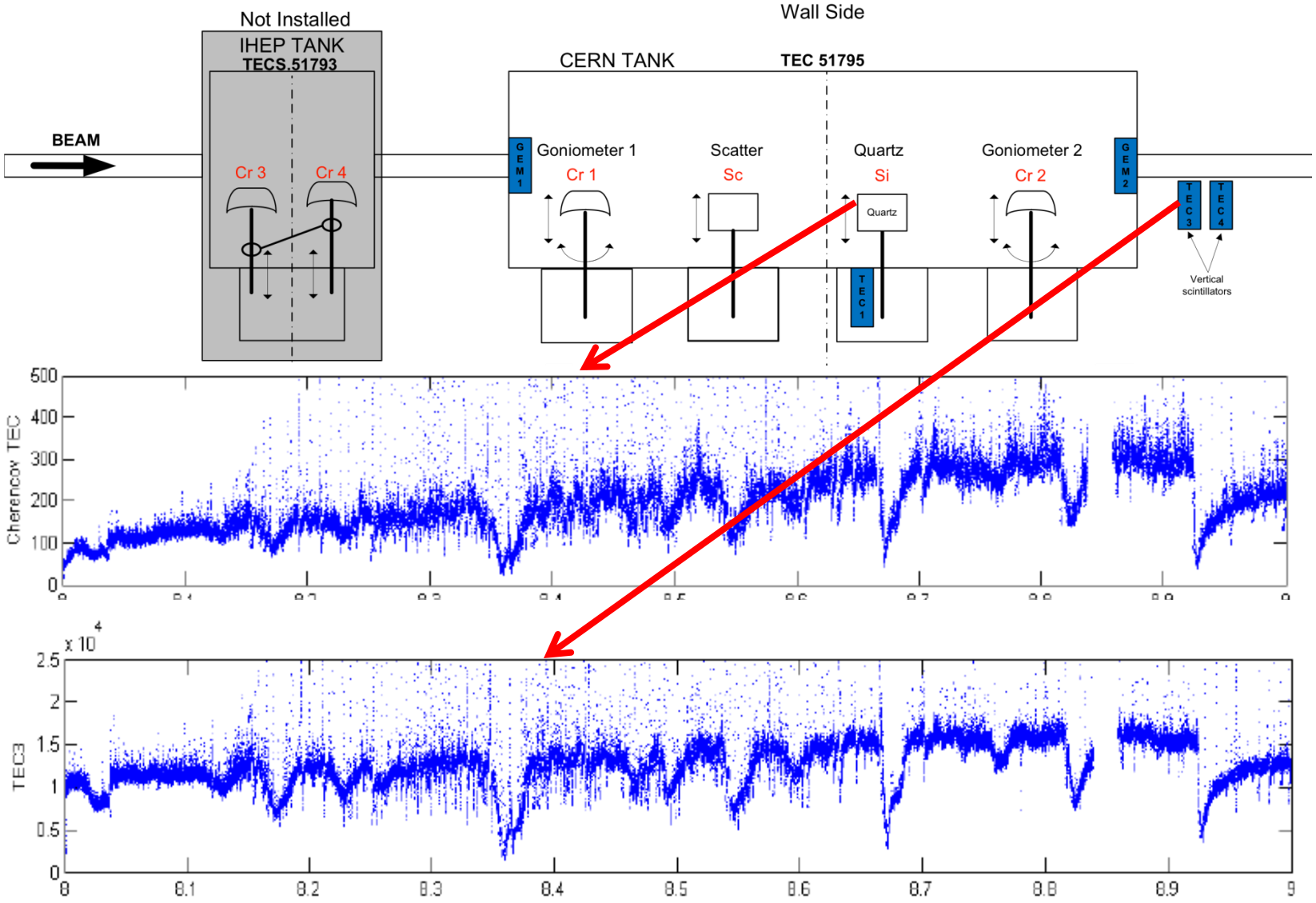






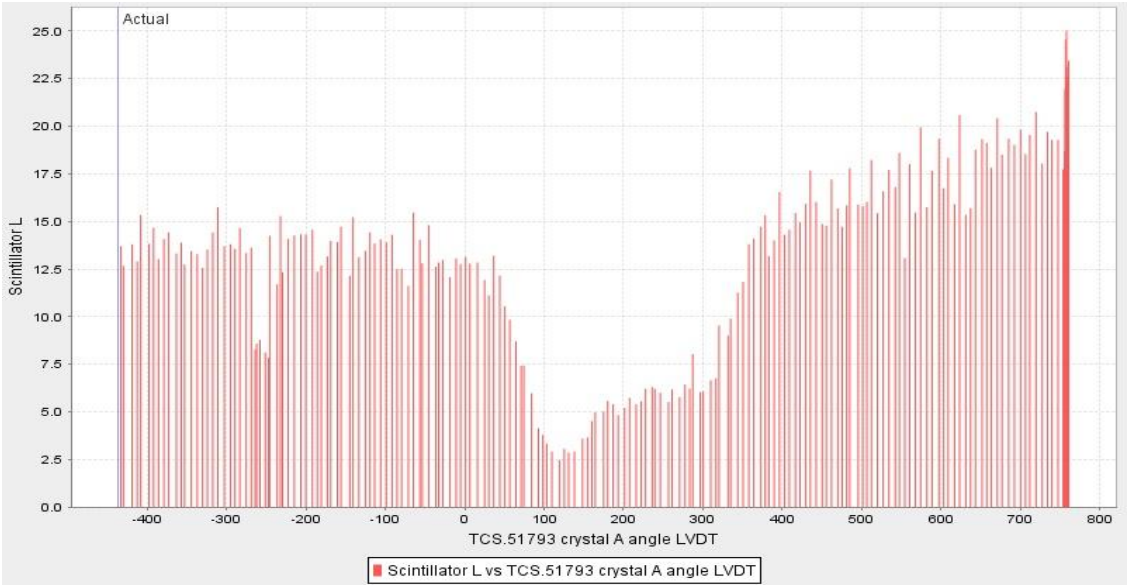


First Cerenkov (TEC) in OUT position as compared with one of the Scintillators (TEC3) during long angular scan with Crystal 1

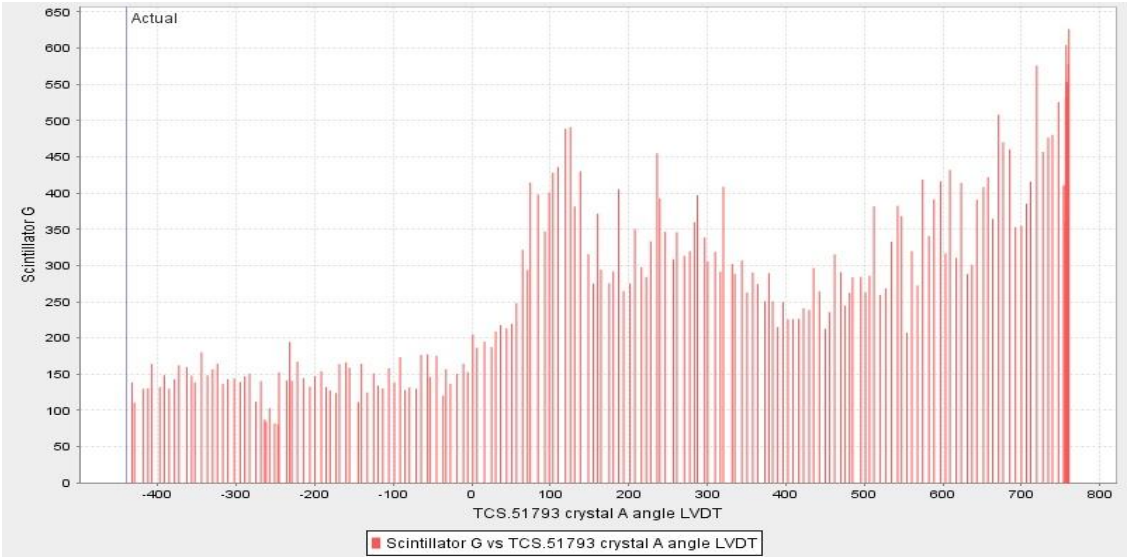


Cherenkov in Absorber (TACW)
(UA9 at SPS, 22.10.10)

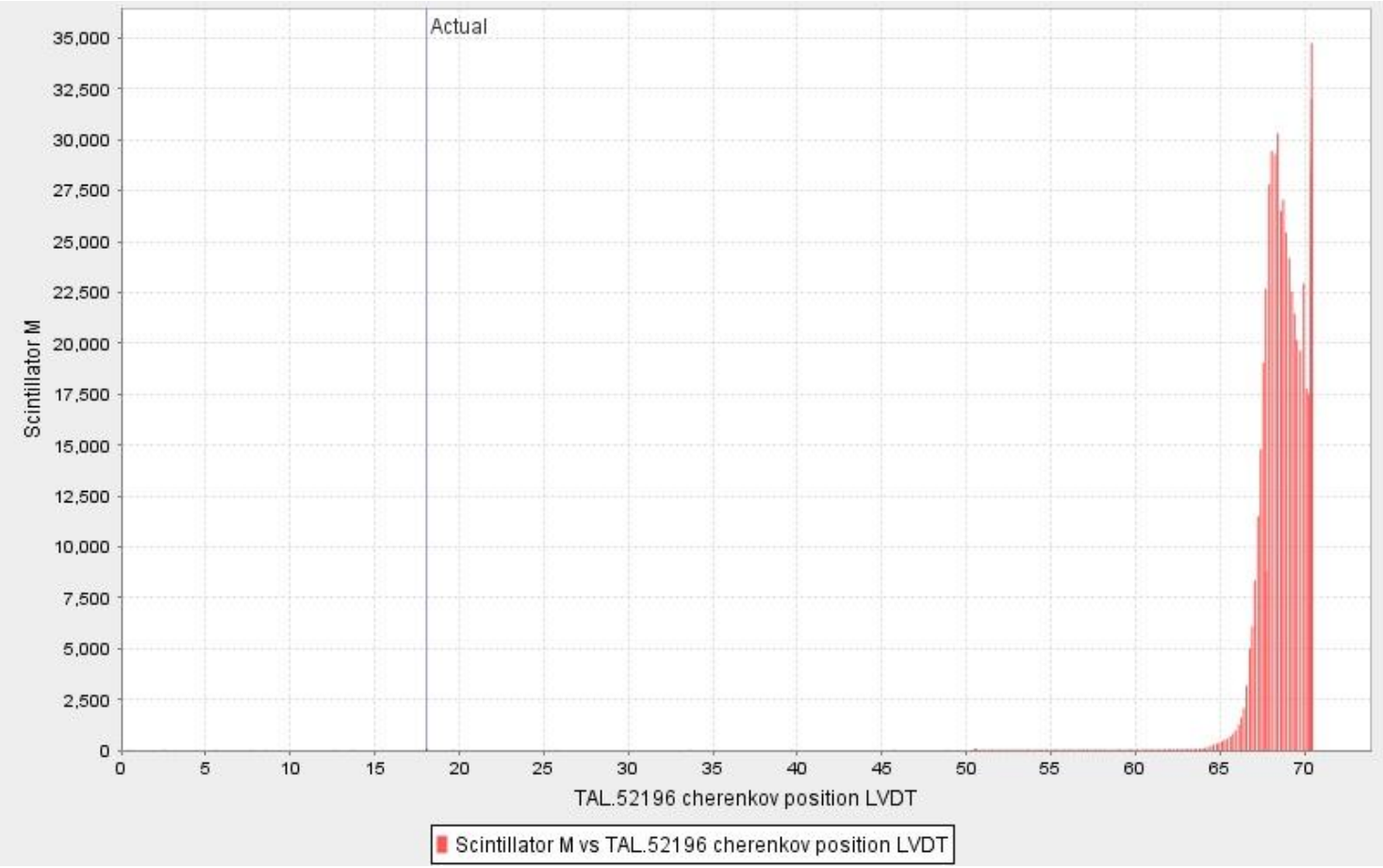
Scintillator L



Cherenkov in TACW



Cherenkov in Dispersive area (TAL2)



Conclusions

- **Cherenkovs provide qualitative information compatible with other detectors**
- **The reason why we can not count halo protons is the one bunch mode when from 10 to 1000 protons cross the Cherenkov within 25 ns**
- **Calibration procedure of Cherenkov in SPS ring is needed**
- **Possible improvements of Cherenkovs:**
- **Light collection can be improved up to 10 times through design optimization**
- **Thickness of quartz can be decreased from 10 mm to 2-3 mm keeping one proton efficiency more than 95%**