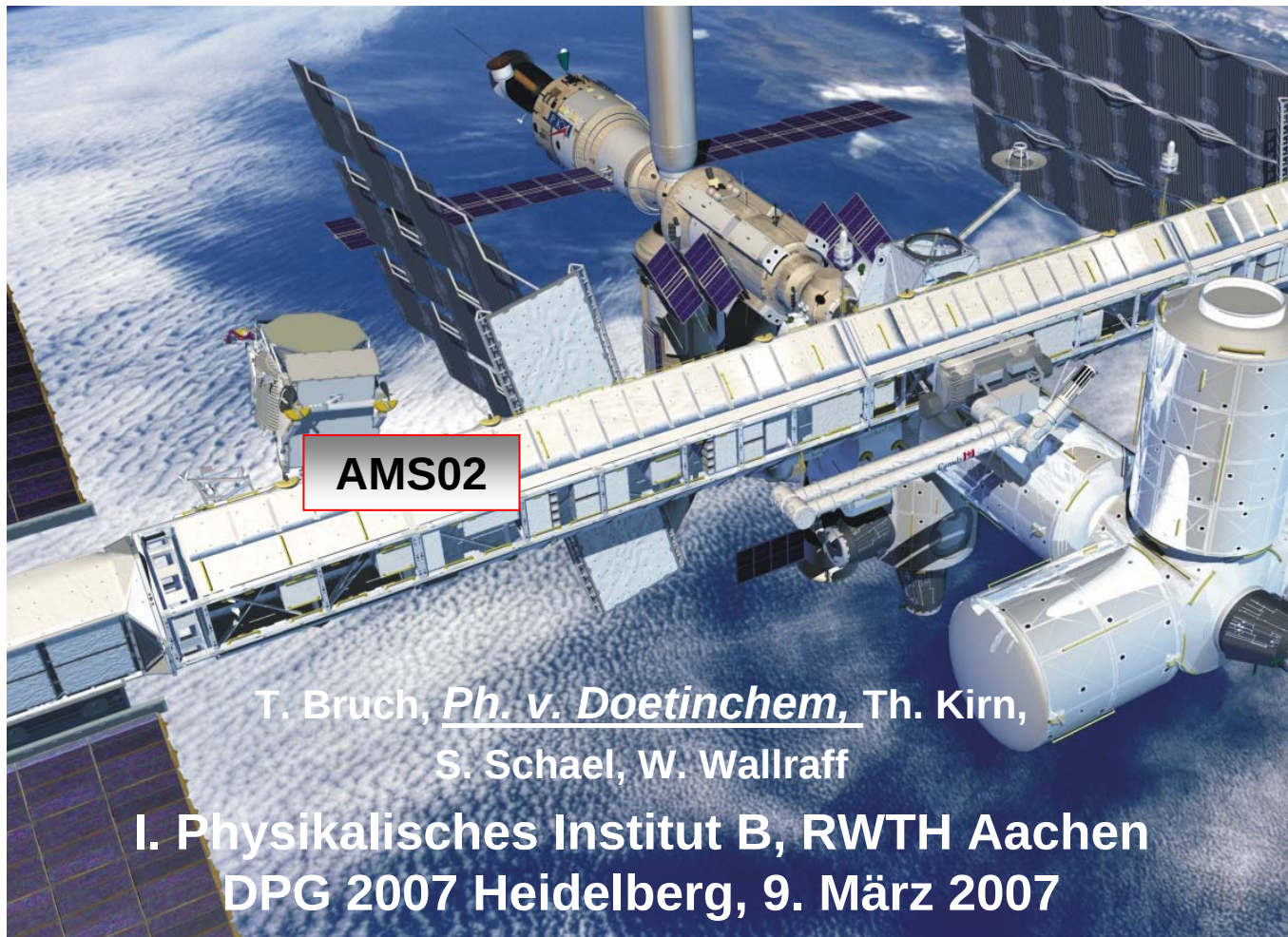


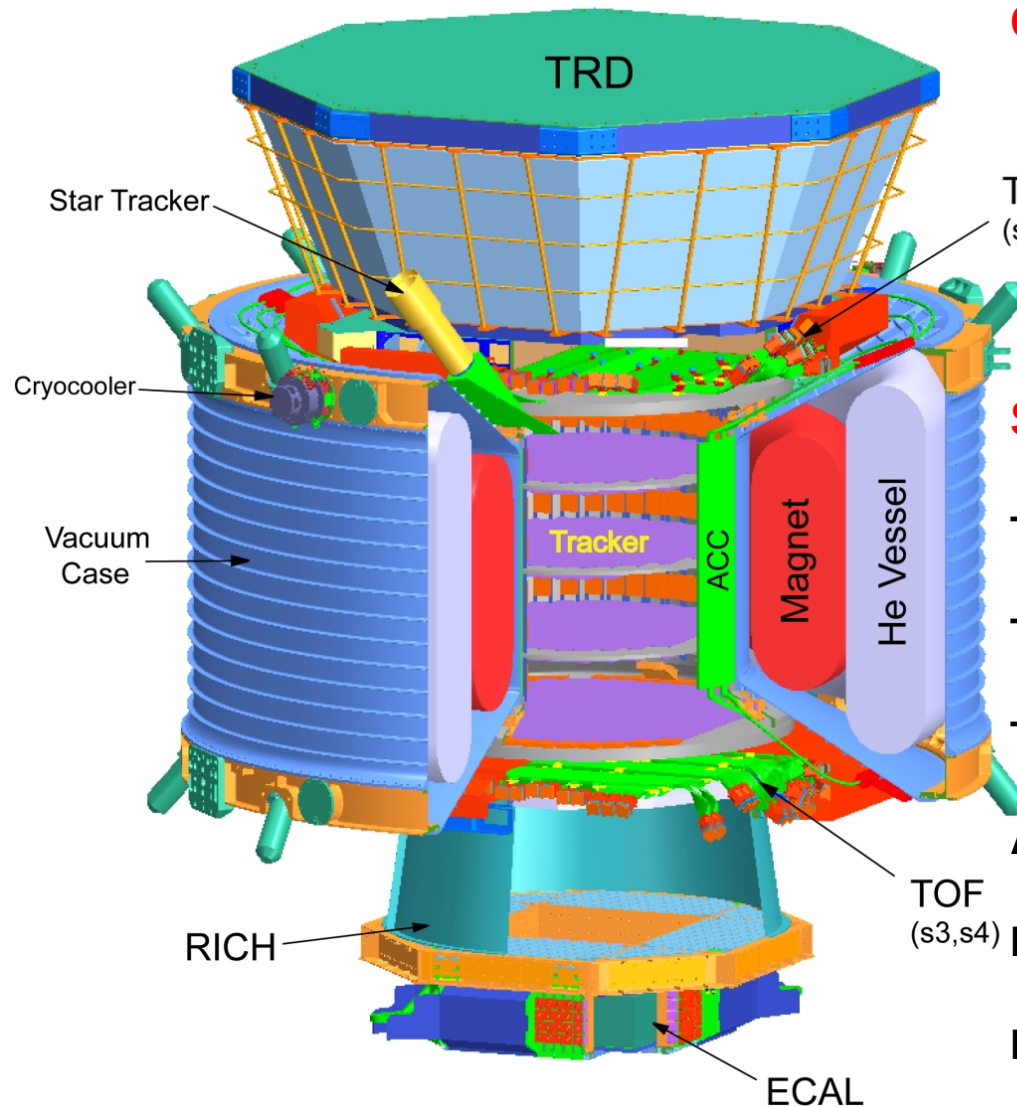
AMS02 Anticoincidence Counter: Produktion & Performance



T. Bruch, Ph. v. Doetinchem, Th. Kirn,
S. Schael, W. Wallraff

I. Physikalisches Institut B, RWTH Aachen
DPG 2007 Heidelberg, 9. März 2007

AMS02 Overview



Goals of AMS02:

- precise spectroscopy of cosmic rays without interactions with atmosphere on the International Space Station
- measurement/bounds on antimatter
- indirect dark matter search

Subdetectors:

Transition Radiation Detector (TRD)

- particle identification

Time of Flight (ToF)

- trigger, velocity, charge

Tracker

- track reconstruction, momentum

Anti-Coincidence Counter (ACC)

- particle selection → next slide

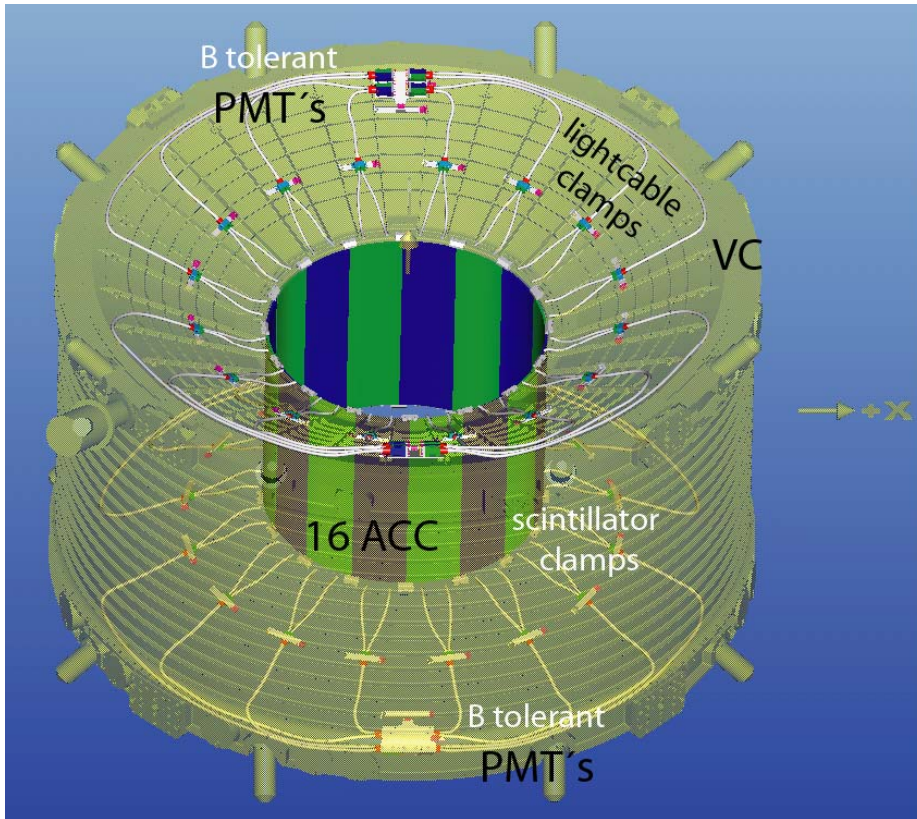
Ring Image Cherenkov Detector (RICH)

- precise velocity measurement

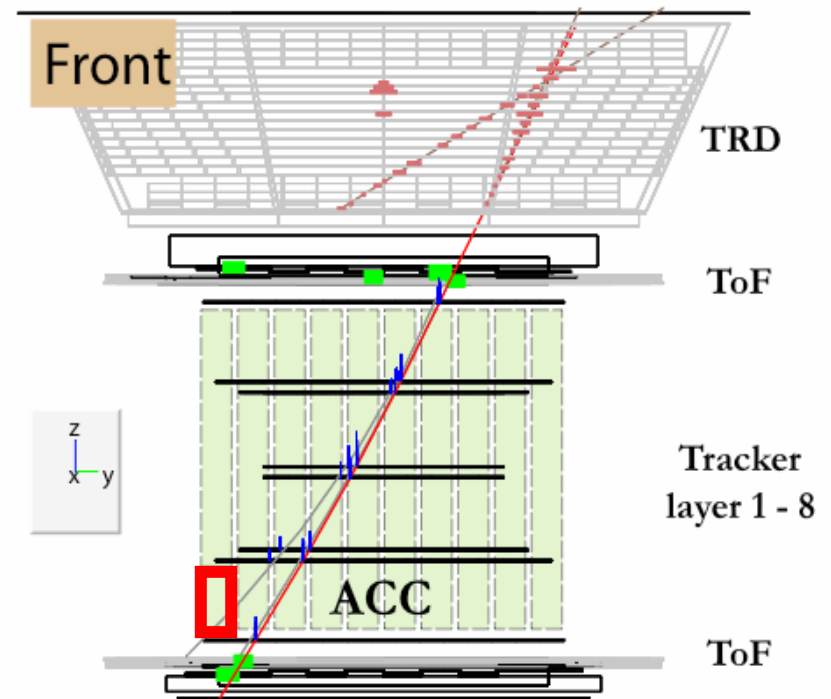
Electromagnetic Calorimeter (ECAL)

- particle identification

ACC System

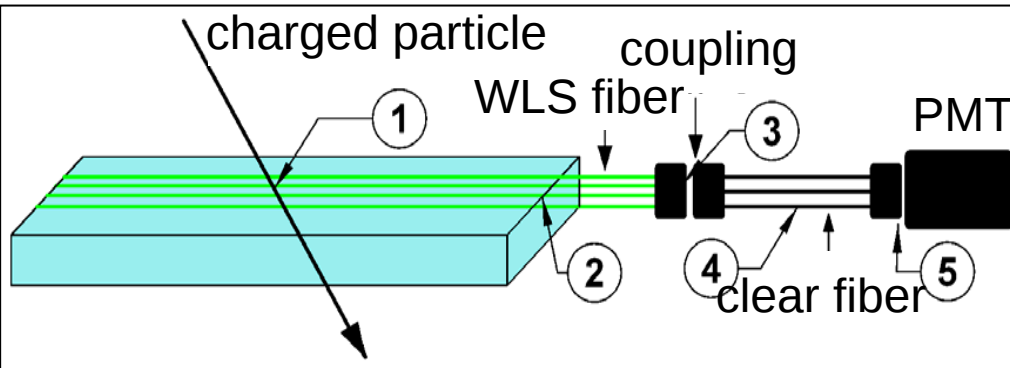


AMS Event Display Run 100/ 3676 Mon Jun 14 18:42:33 2004
5 GeV/c **He** nucleus interacting in TRD



- to avoid wrong charge reconstruction in tracker
- small ACC inefficiency needed ($<10^{-4}$) for measurement of antimatter with very clean single track events

ACC principle



Panel: Bicron BC414

826.5mm x 230mm x 8mm

WLS: Kuraray Y-11(200) MSJ

($\lambda = 3.98 \text{ m}$, 0.86 dB/m)

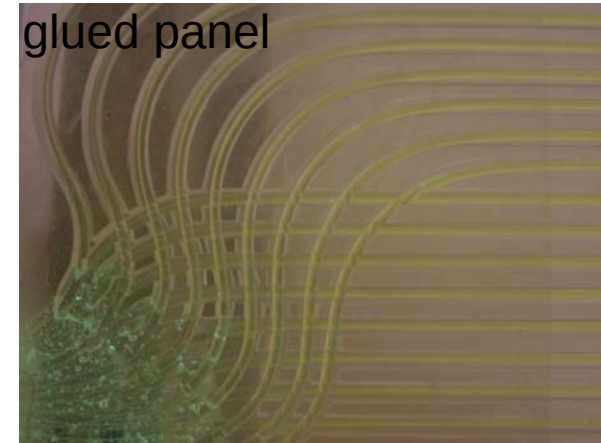
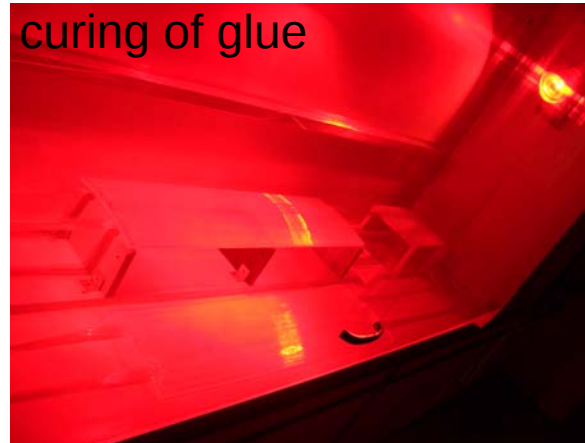
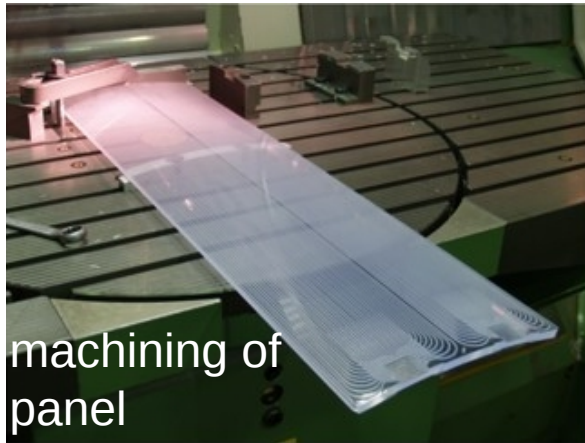
CLF: Bicron BCF-98

($\lambda = 6.59 \text{ m}$, 0.50 dB/m)

PMTs: Hamamatsu R5946



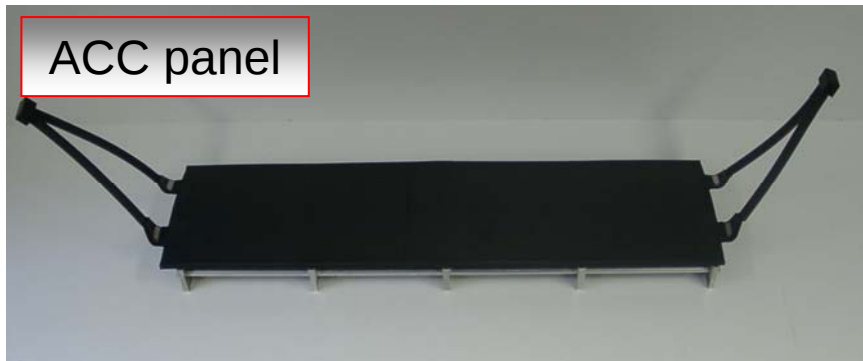
ACC Panel production



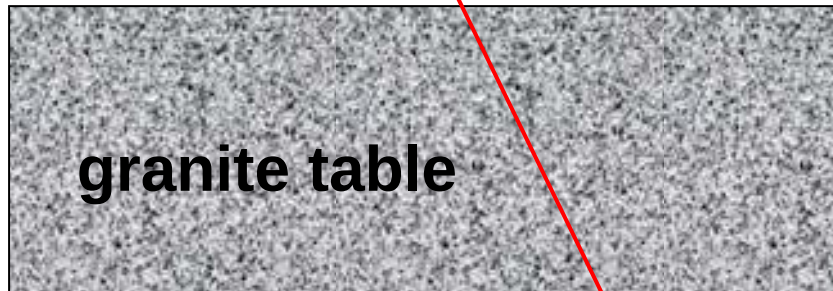
finished panel



Cosmic Test in the lab

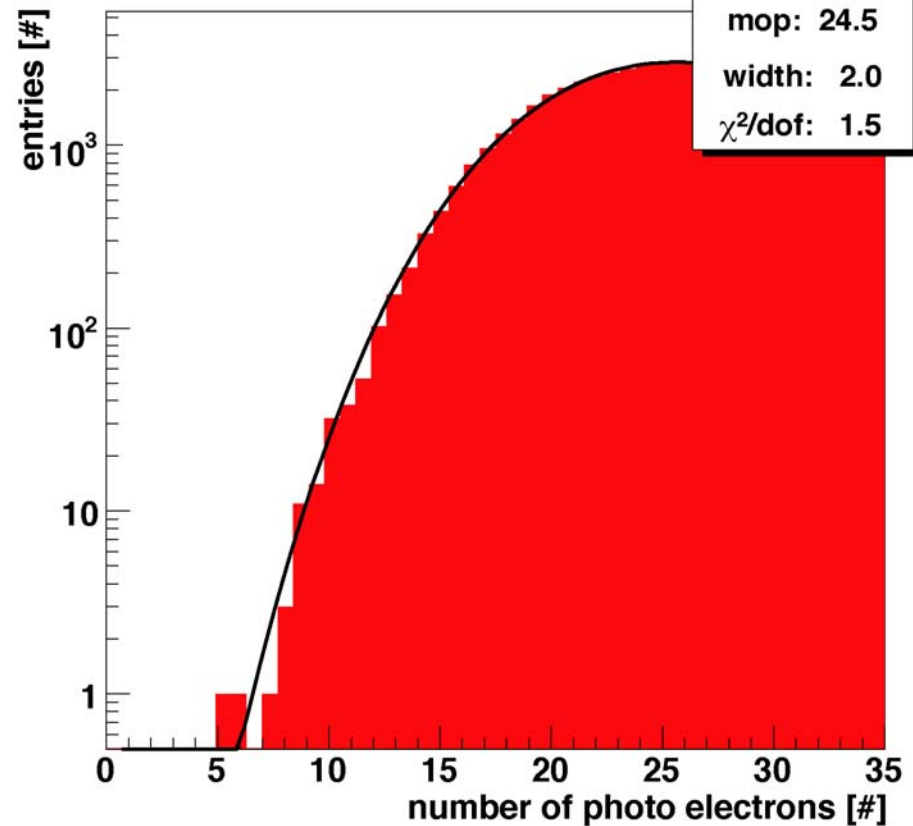


T1
ACC
T2

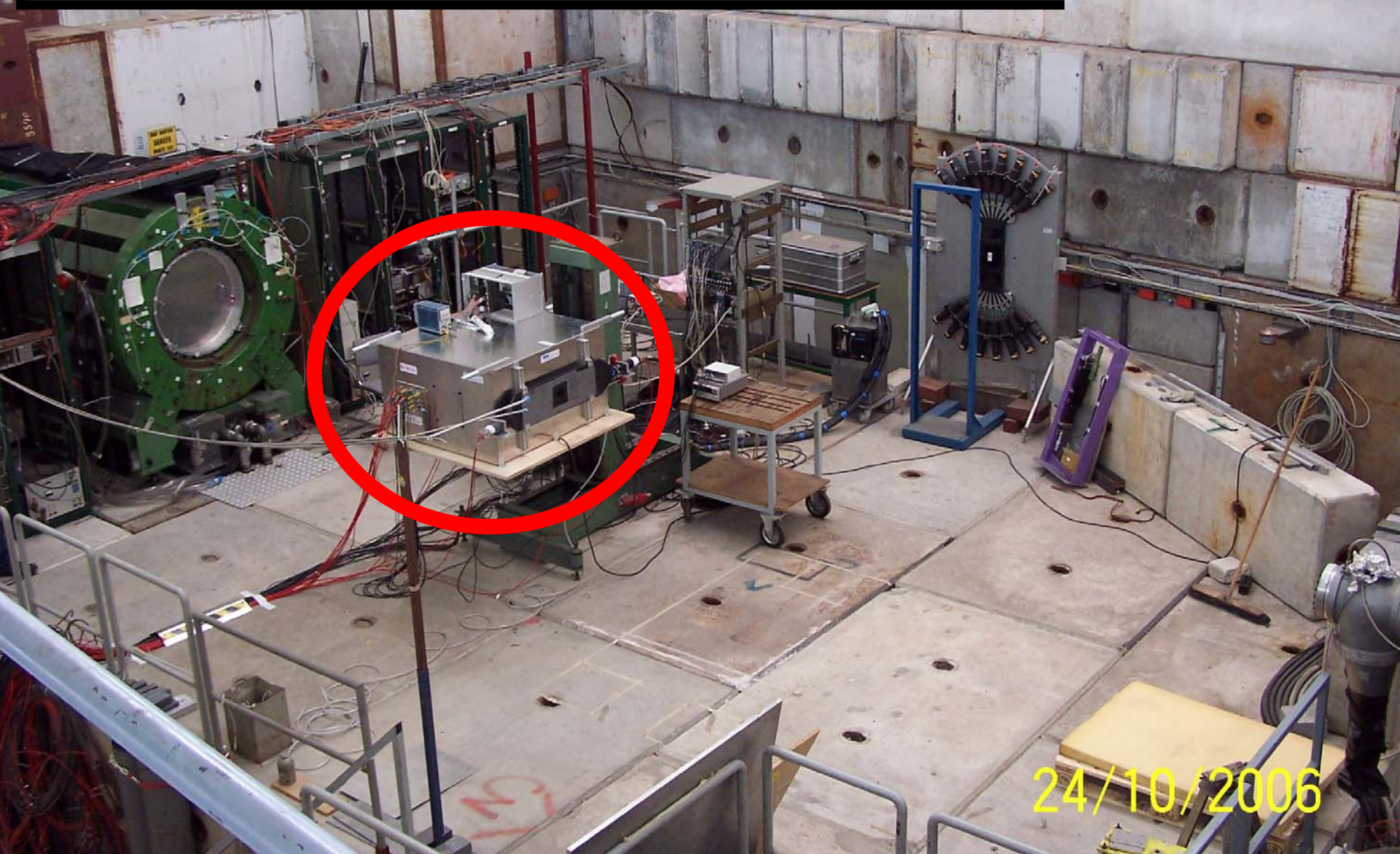


T3

0 missed out of 80658 triggers
Extrapolation gives inefficiency of:
inefficiency = $1 \cdot 10^{-8}$



ACC Testbeam: T9 East Area, p^+ 10GeV



ACC Testbeam: T9 East Area

ACC PMTs

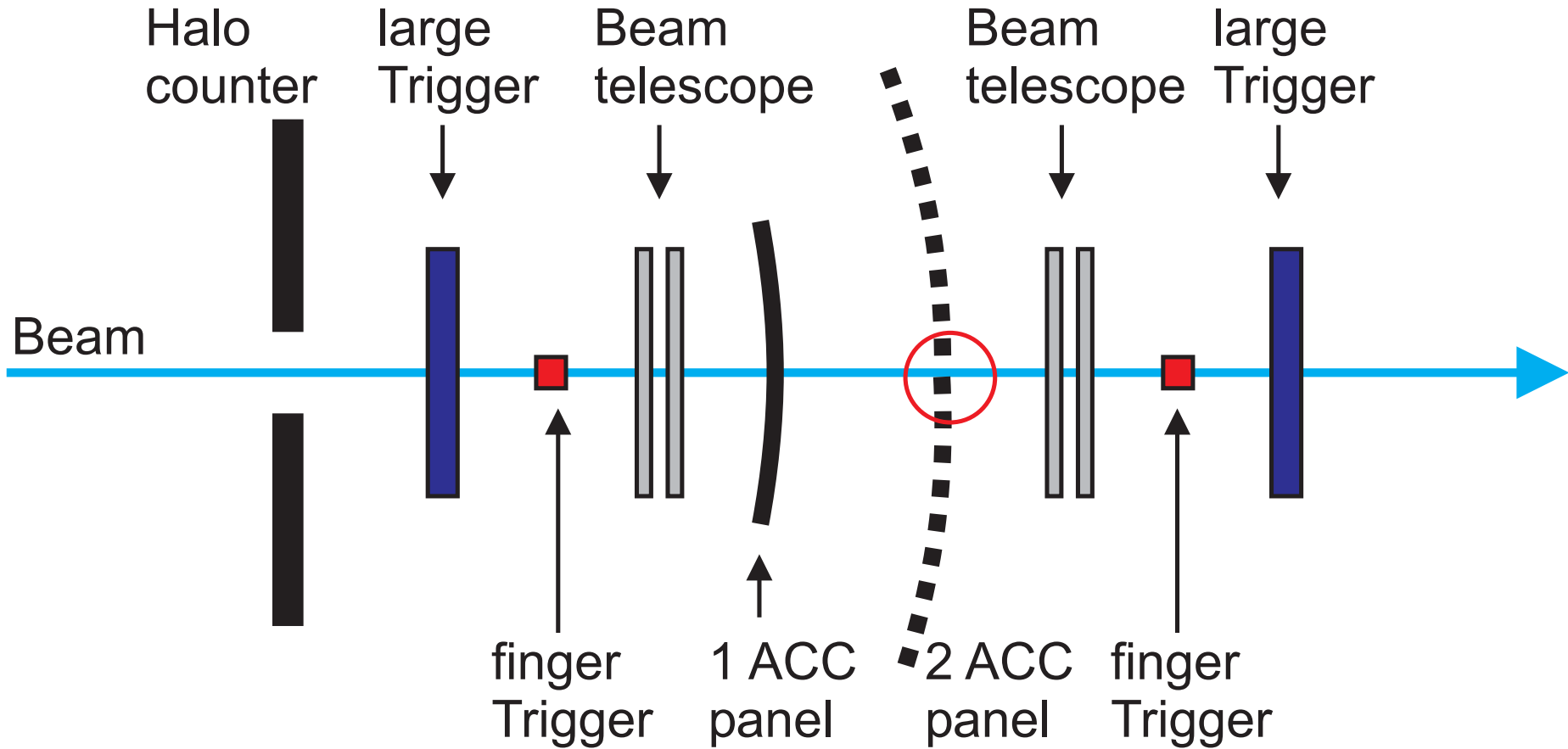
Beam
telescope

Beam

Trigger
Counters

18/10/2006

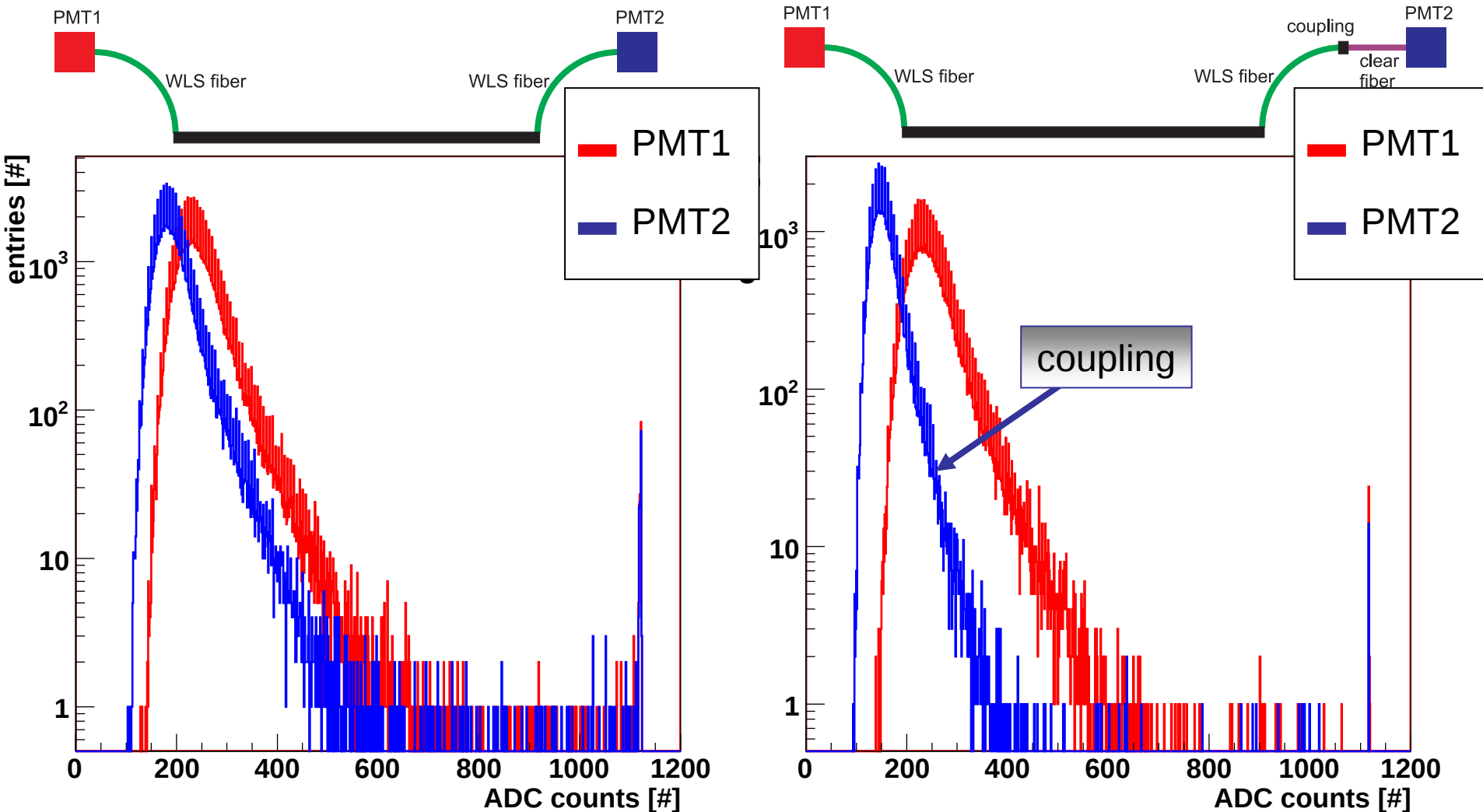
ACC Testbeam



- ACC panel can be replaced by two ACC panels to investigate the slot region between the panels with the finger trigger, analysis is ongoing
- Only clear single track events in beam telescope with hits in each large trigger counters are used (slot region: + hit in finger trigger)

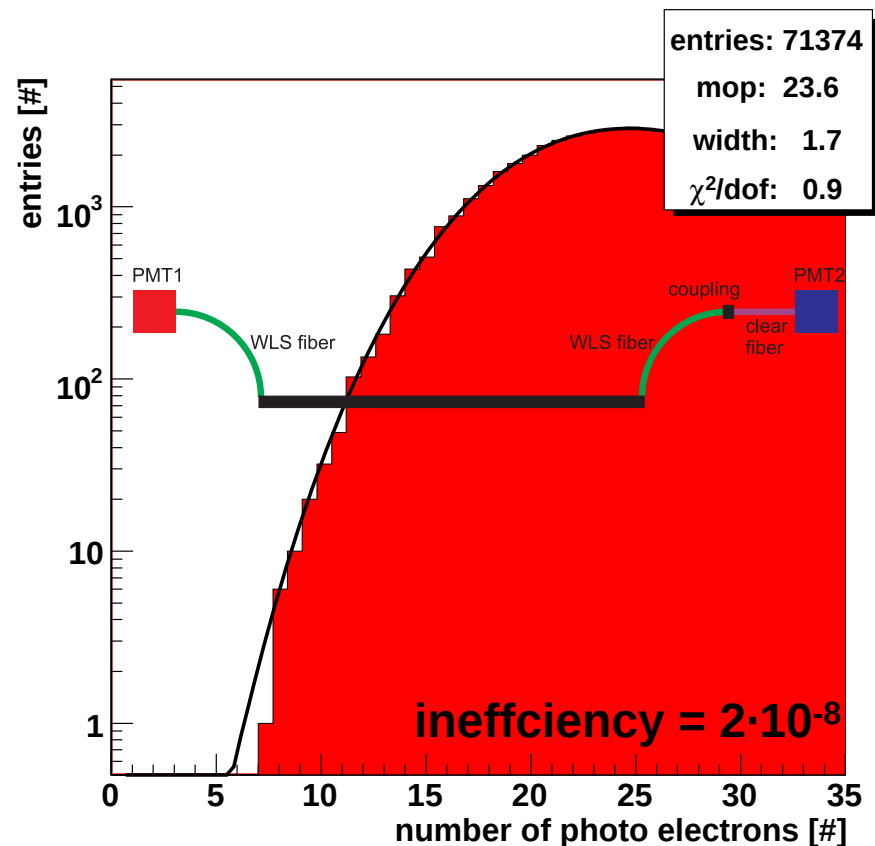
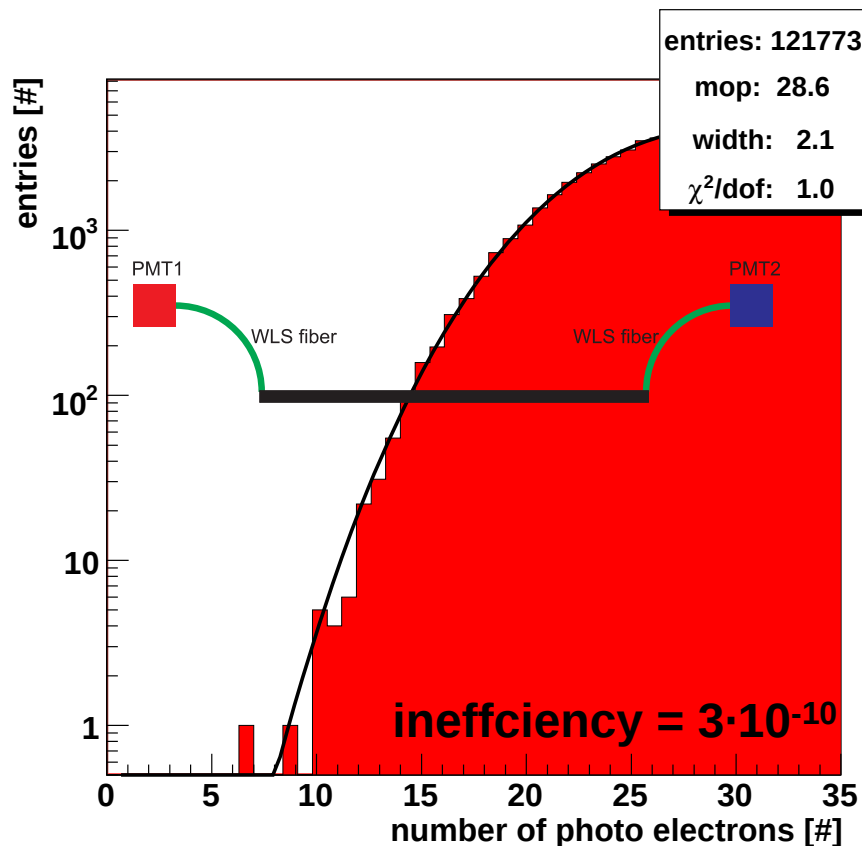
Single ACC in center region

region covered
by beam



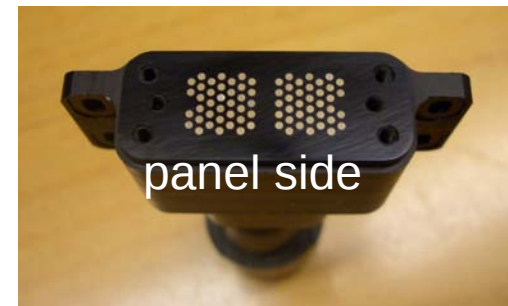
Single ACC in center region

region covered
by beam



- total number of photo electrons in the panel (calibrated PMTs)
- **very good inefficiencies in center region**,
but analysis of slot region will lower effective inefficiency
- coupling has a **transmission eff. of 65%** (good agreement with AC lab facilities)

Coupling: WLS - clear fiber



Coupling of WLS $\leftrightarrow$ clear fiber is under test!

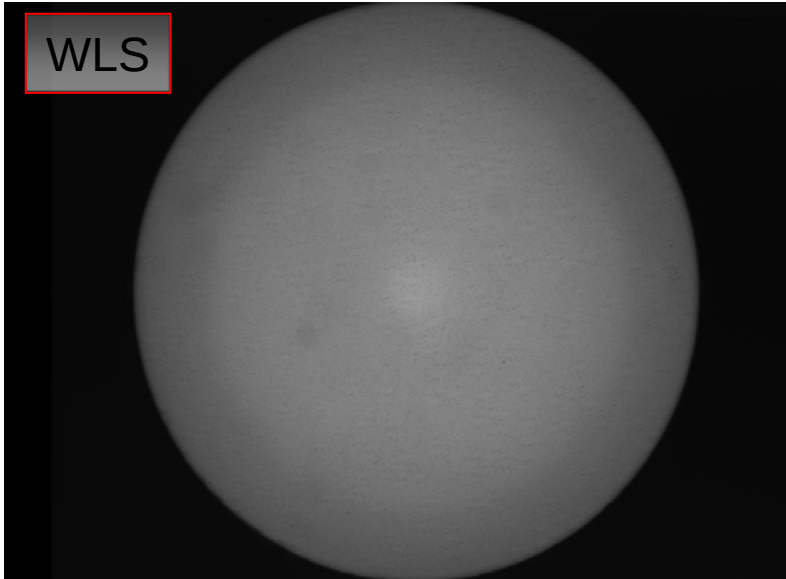
choice of material for clear fiber:

better aperture matching, less damping

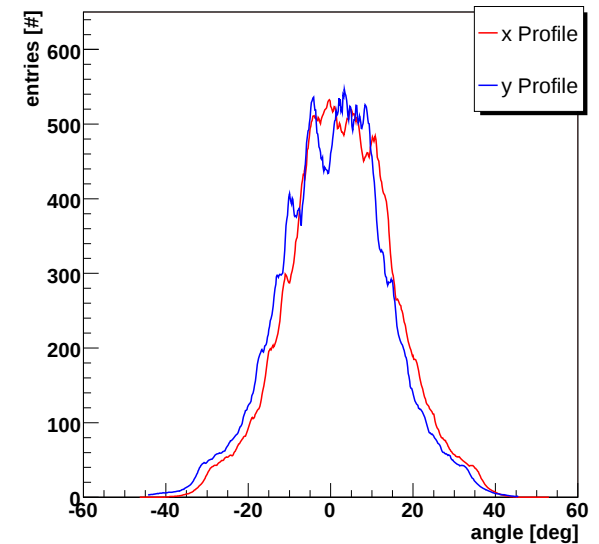
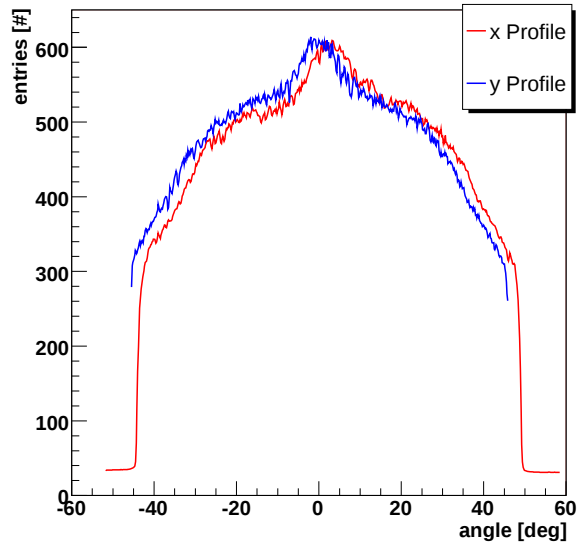
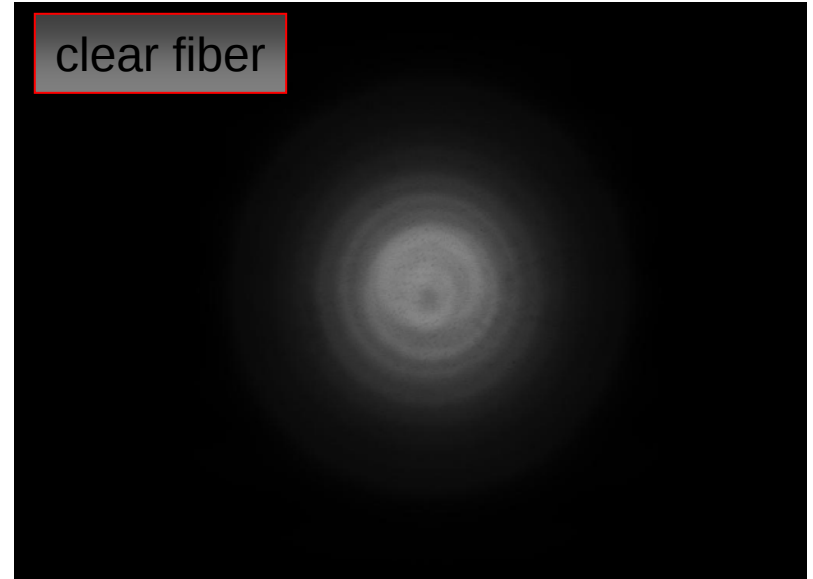


Far field measurements (POFAC FH Nürnberg)

WLS

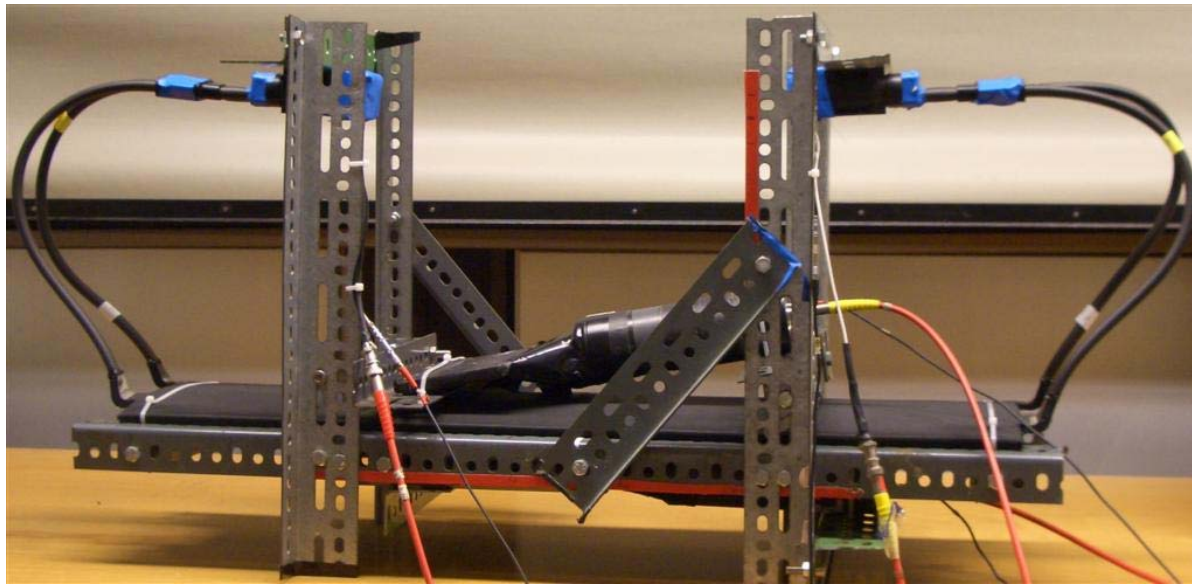


clear fiber



Summary & Outlook

- Production of flight panels is in progress
- Testbeam results show a good behaviour of the ACC system in the center region
analysis of slot the region is ongoing
- Try to optimize coupling and clear fiber!
- Cosmic test @ CERN with flight electronic is ongoing



- **ACC will be integrated into AMS-02 in September 2007**