



---

# Mounting of the Cerenkov Muon Veto in the water tank

Peter Grabmayr

GERDA Collaboration

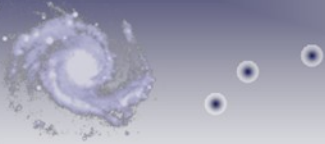
Eberhard Karls Universität Tübingen  
Germany

EBERHARD KARLS  
UNIVERSITÄT  
TÜBINGEN



**bmb+f** - Förderschwerpunkt  
Astroteilchenphysik  
Großgeräte der physikalischen  
Grundlagenforschung

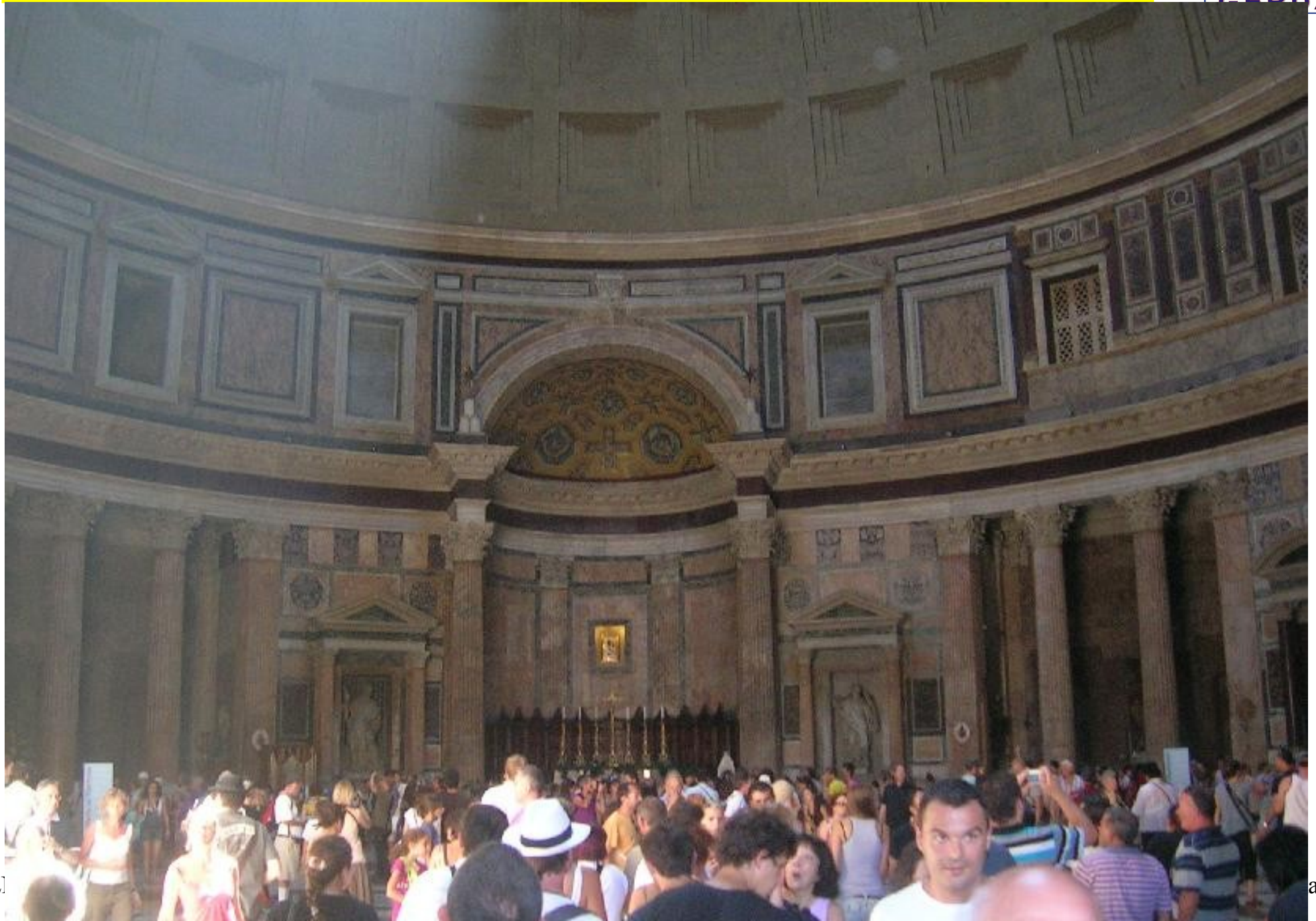
Kepler Center for Astro and Particle Physics



# principle



# principle



# tasks

---



**task:** to mount the Cerenkov Muon Veto

66 PMT capsules in the water tank

6 below cryostat (pillbox)

20 on the floor

40 on the wall of the water tank

VM2000 reflector foil

pillbox, cryostat, wall, floor

cables & cable tray, LED & fibres+diffuser

Jackodur for cryostat (+HD)

done by August 15, 2009

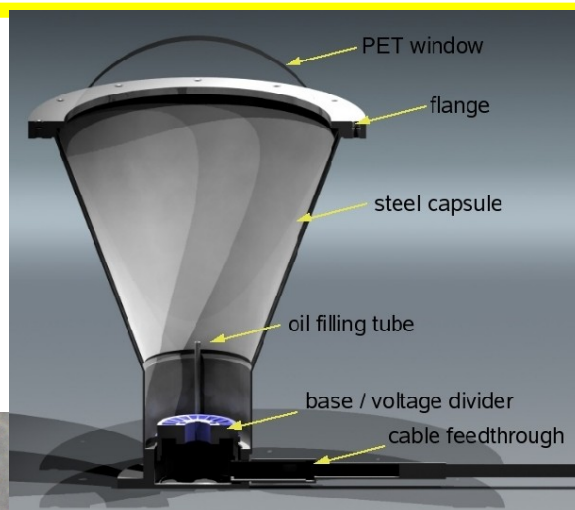
---

- ◆ Plastic muon veto on clean room
- ◆ Data acquisition and analysis
- ◆ Slow control

# PMT



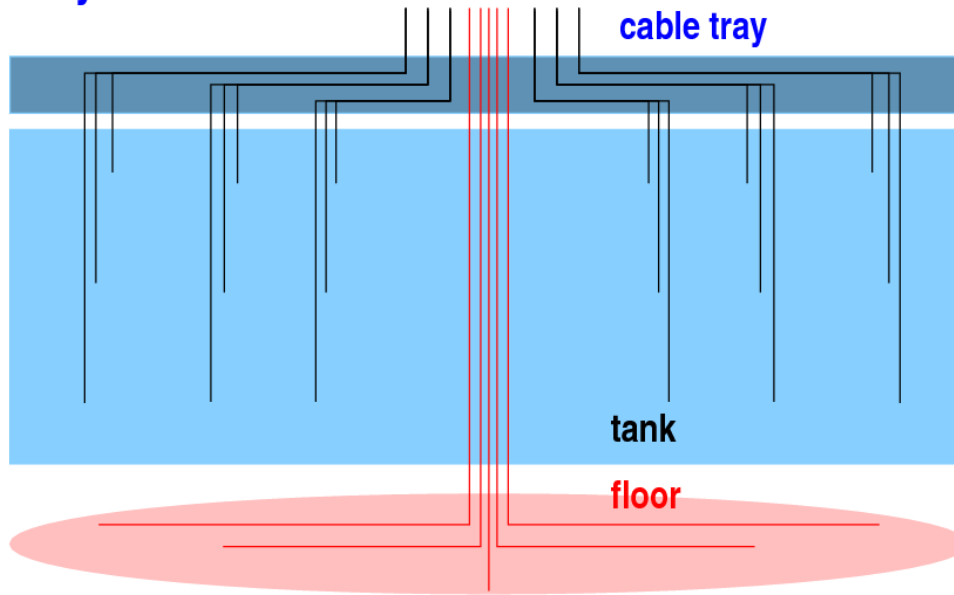
socket



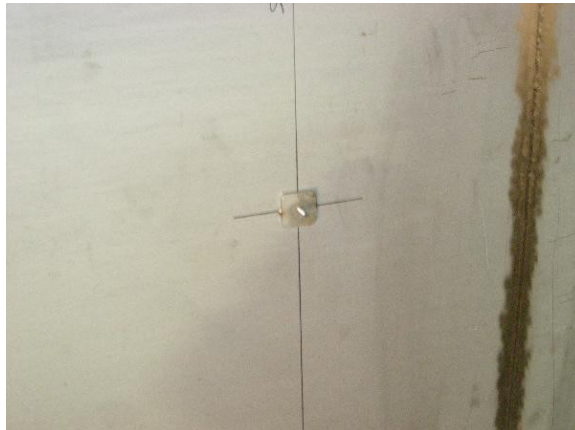
studs in WT

# cables, cable tray

Layout inside water tank

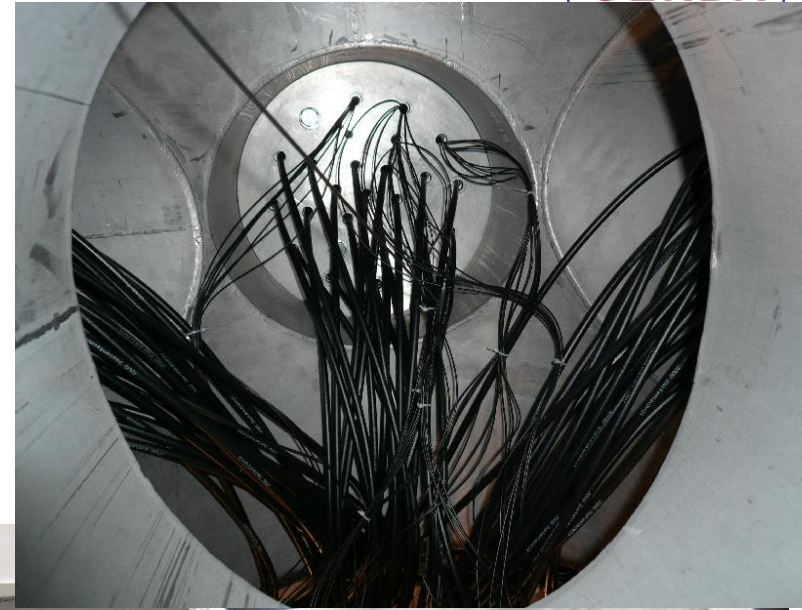
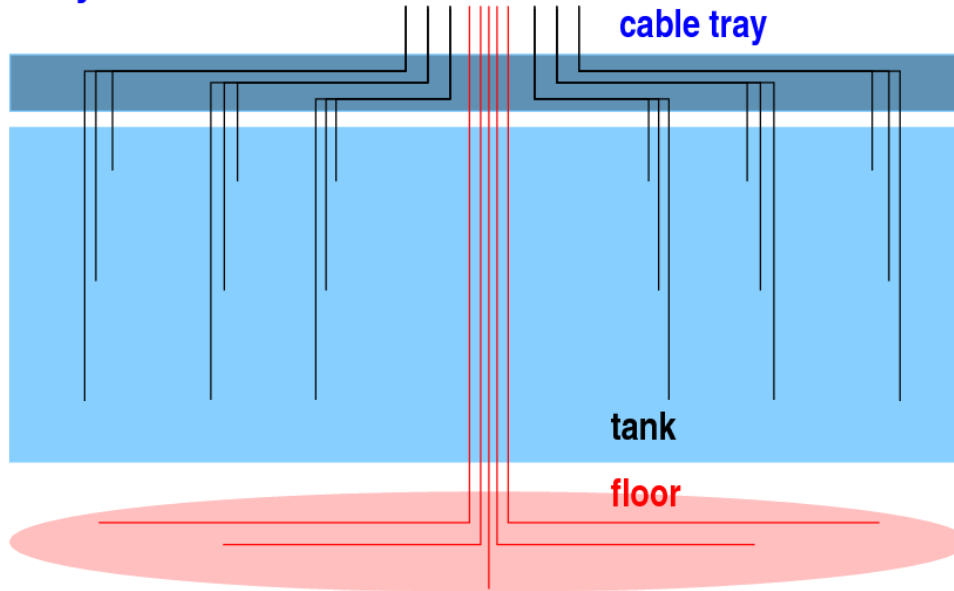


single stud



# cables, cable tray

Layout inside water tank





# Moving up

---



# Moving around

---



# cryostat



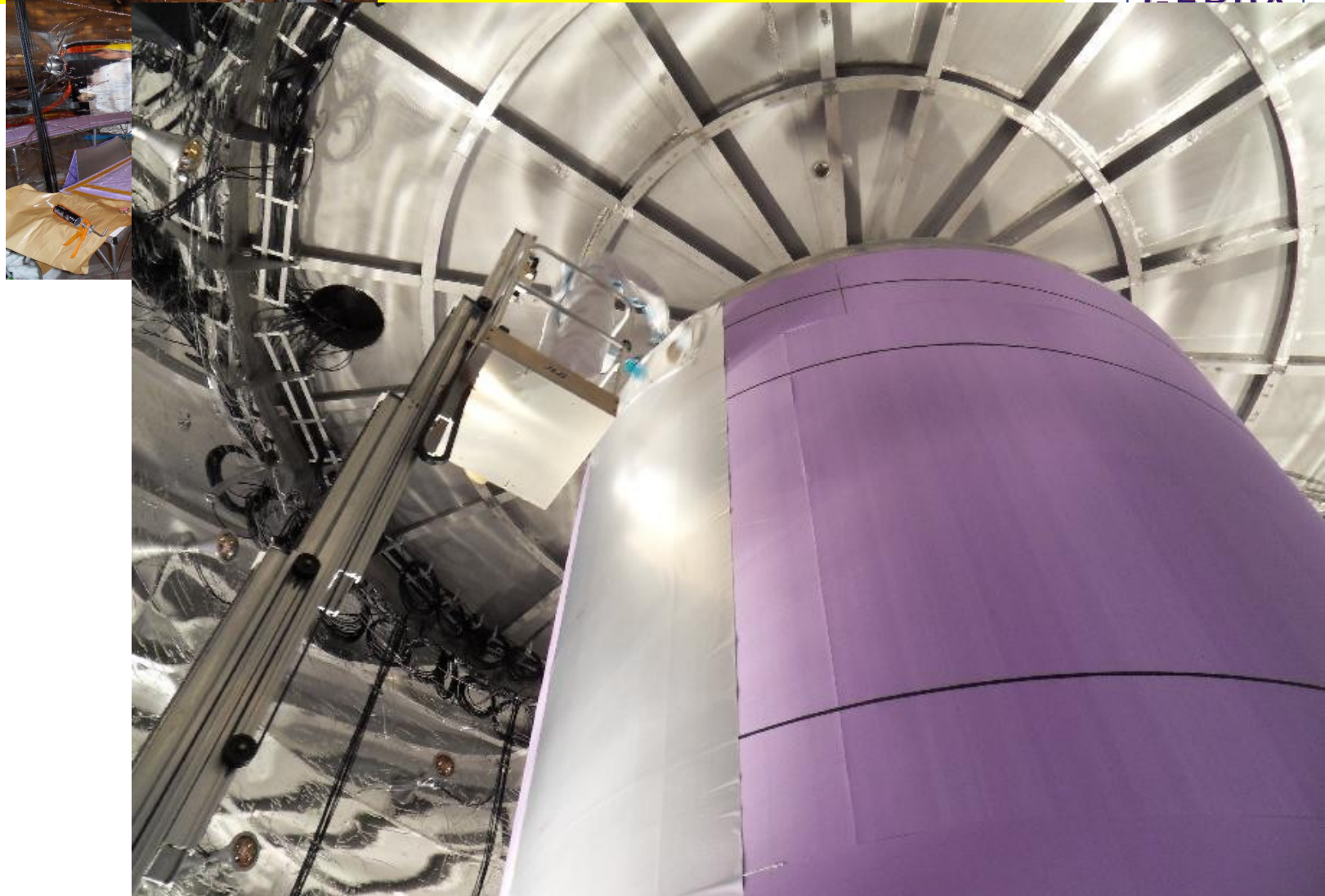
# cryostat



# cryostat



# cryostat



# cryostat



# cryostat





# cryostat



LNGS, Sep 28-30, 2009

# neck of cryostat



# neck of cryostat

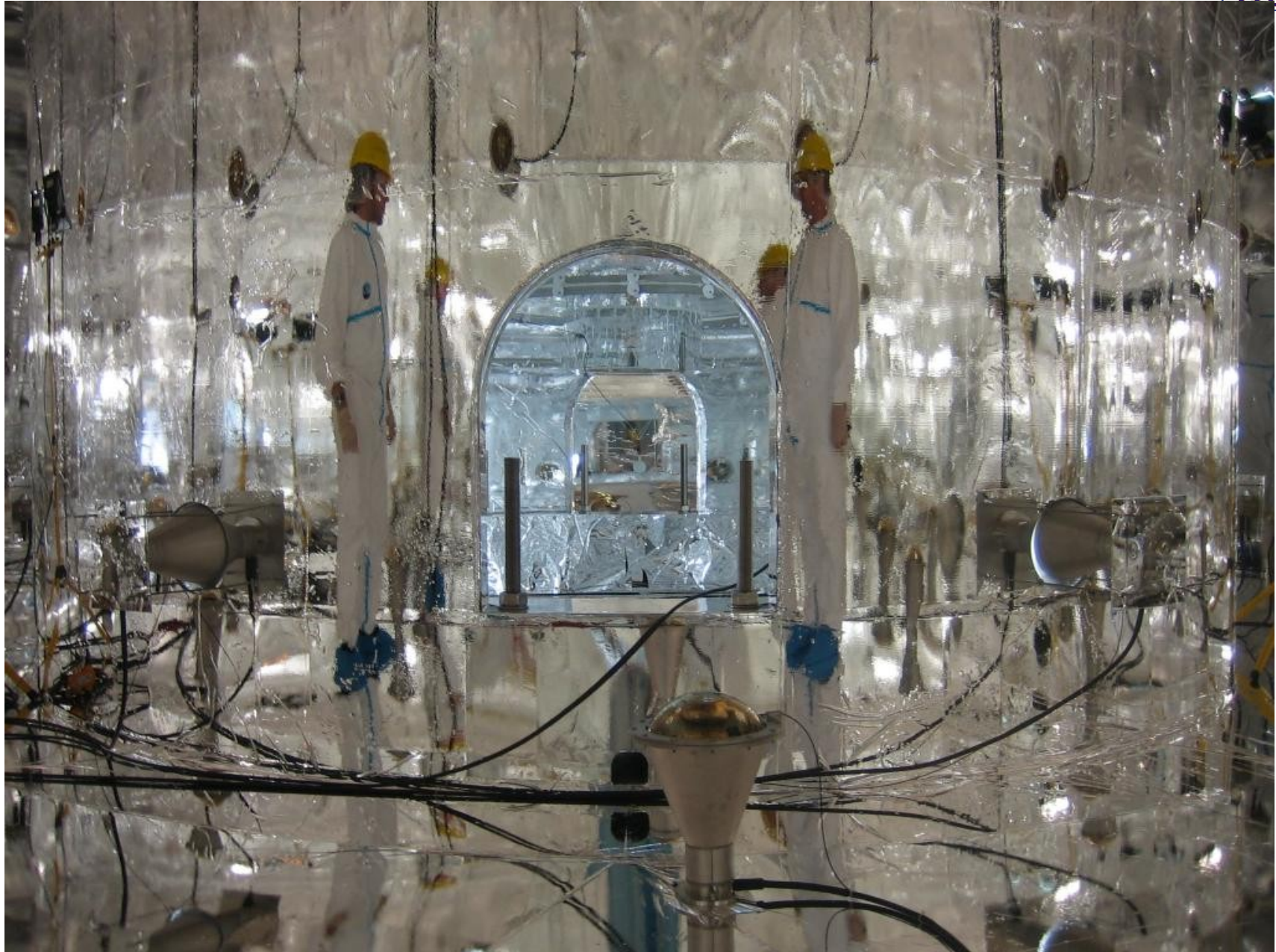
---



# neck of cryostat

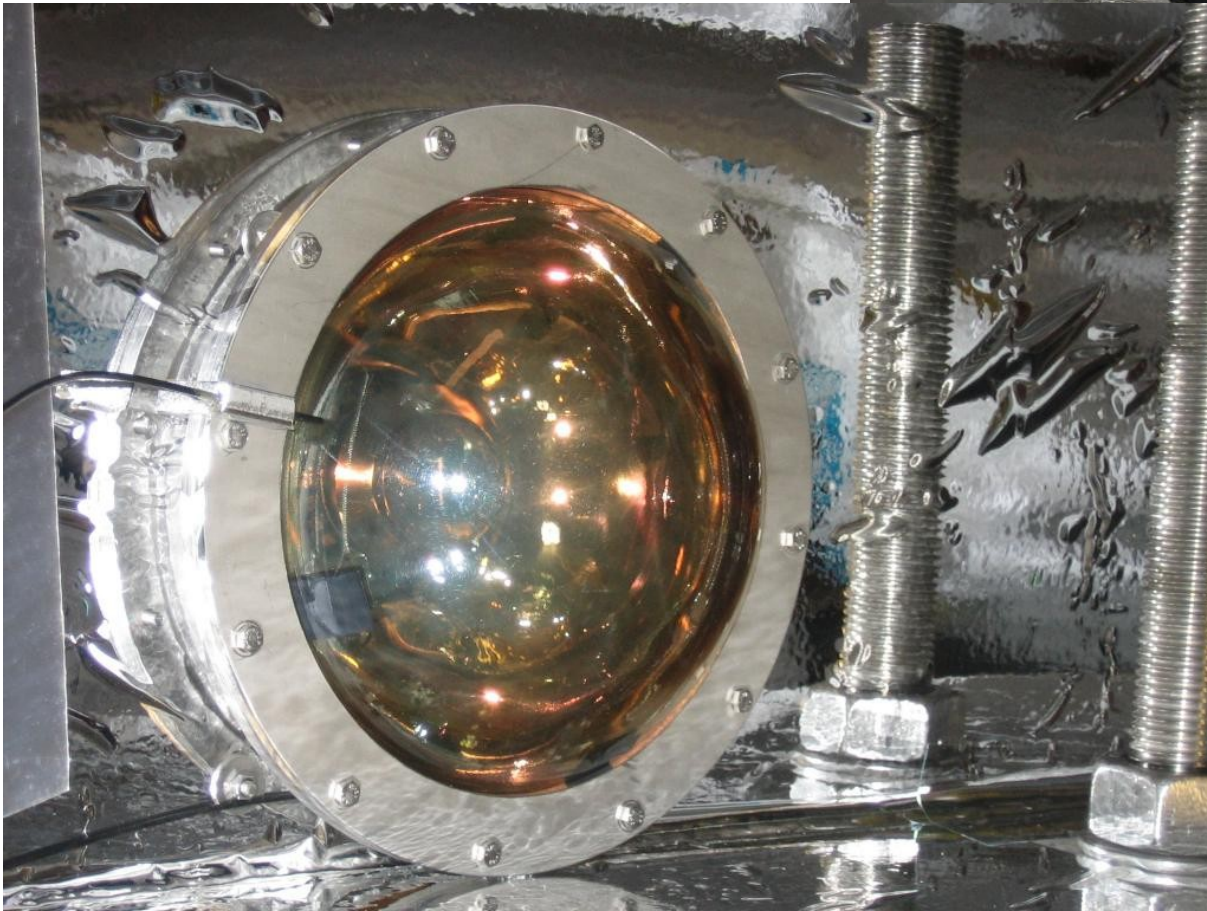






# pillbox

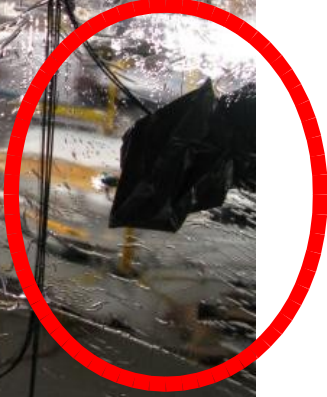
---







# test of PMT



from top



# Cleaning up

















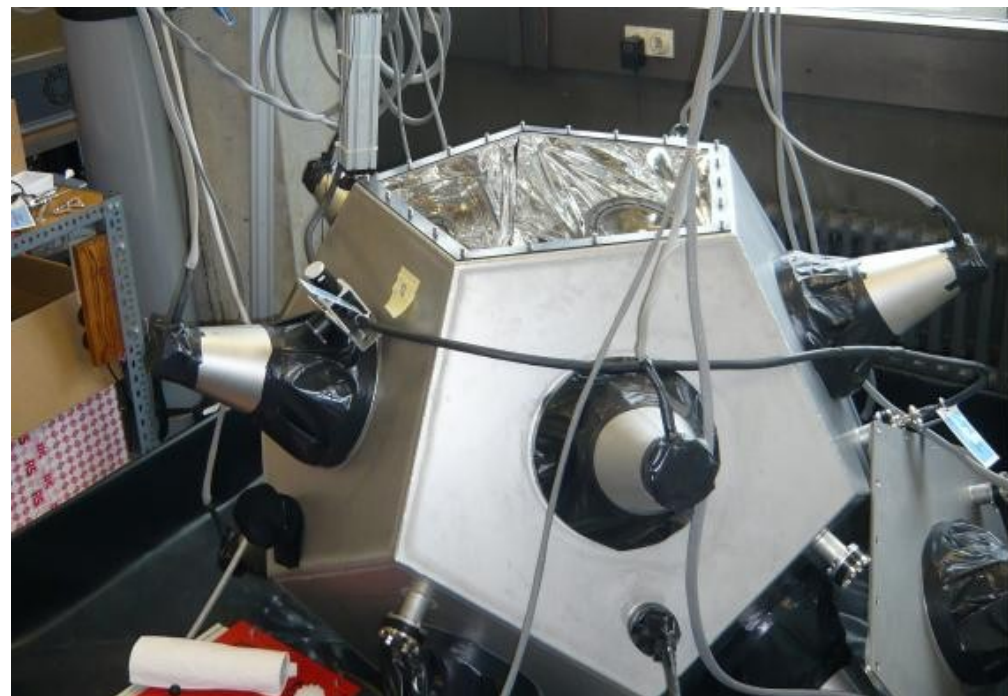
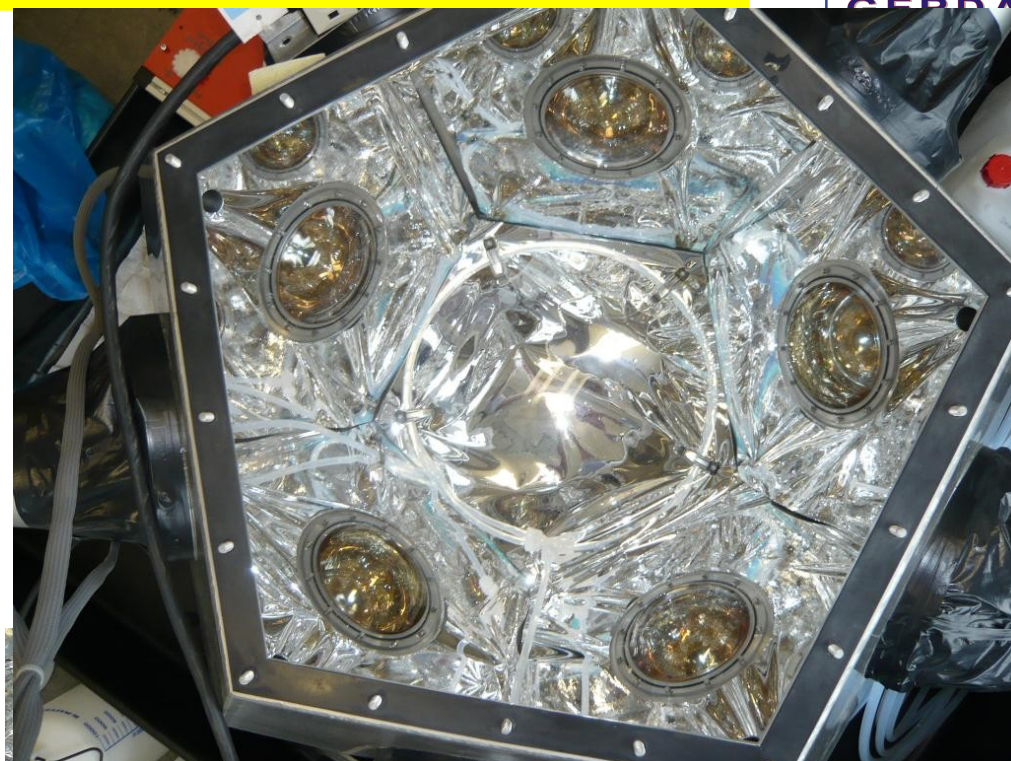


# tests with DODI



9 PMTs in  $\sim 1\text{m}^3$  water

Test of base and DAQ



## Corrosion found in Tü

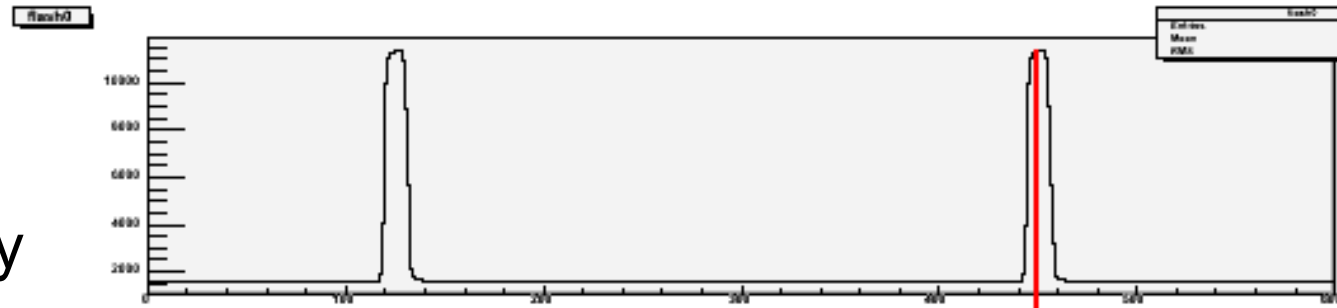


# tests of DAQ

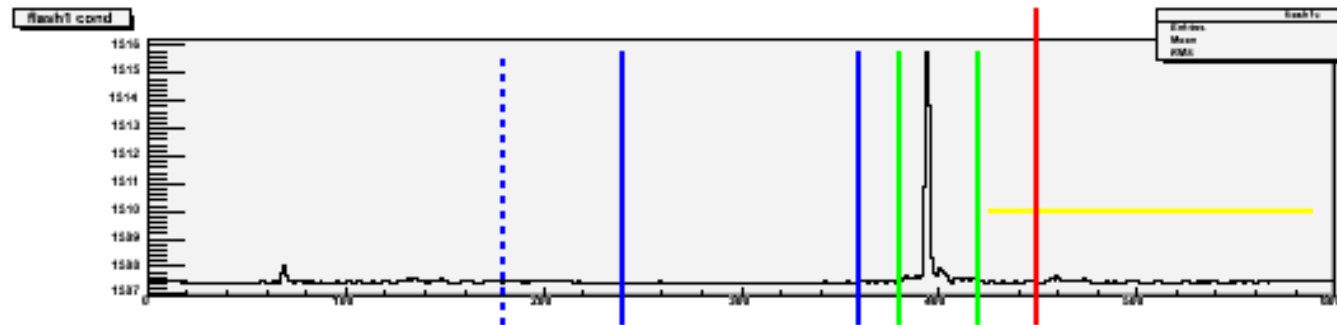
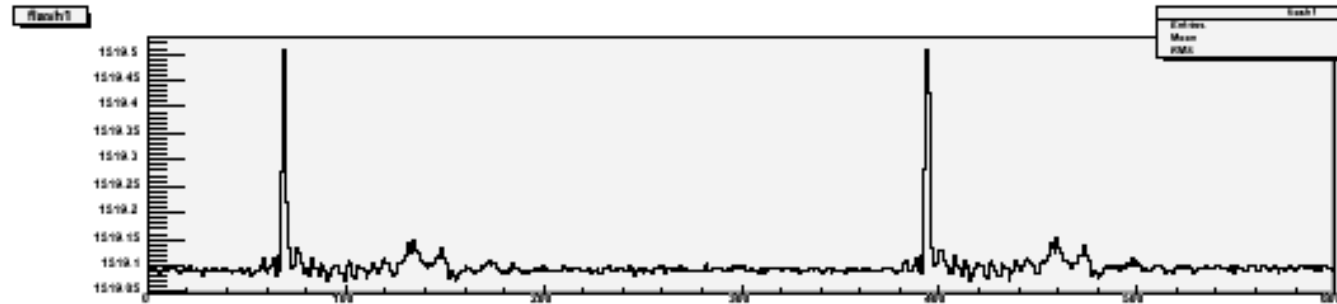


T. Kihm

Struck Flash ADC  
Pulser with low intensity



pulse trains for s.p.e.

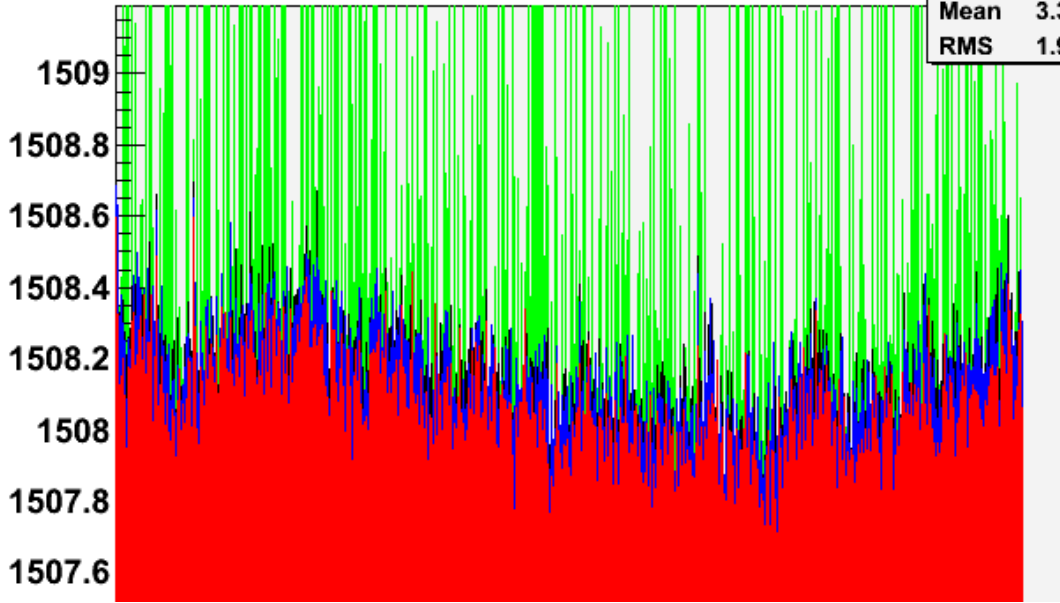


# tests of DAQ



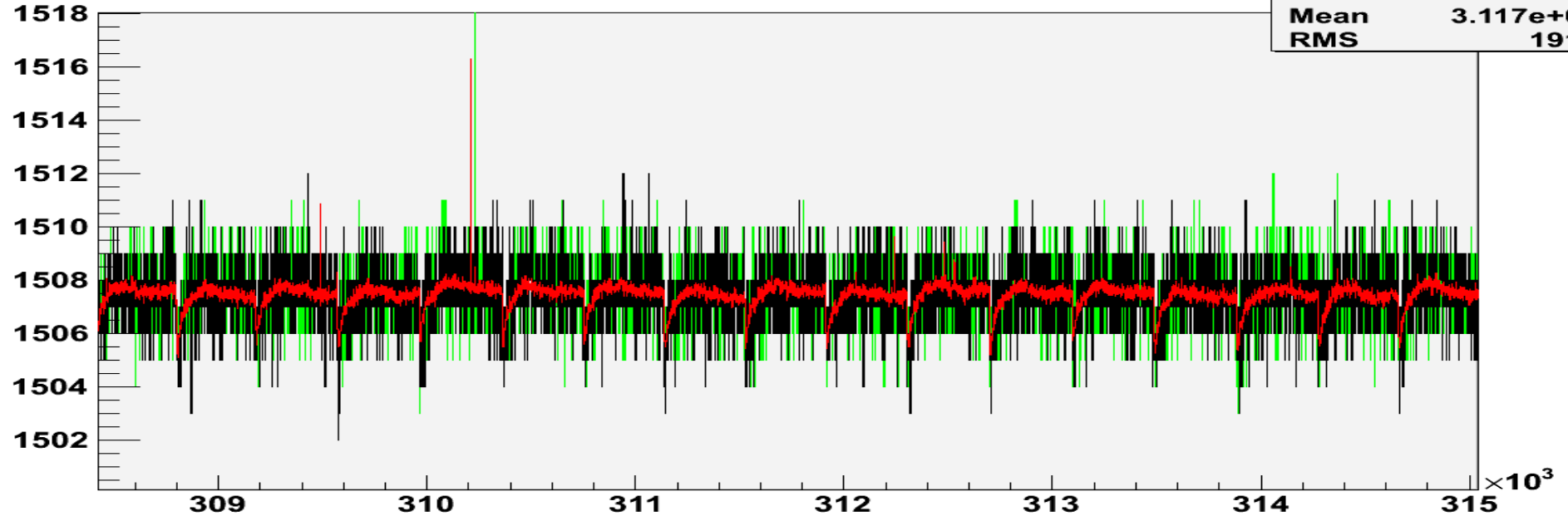
average

timeave	
Entries	664761
Mean	3.324e+05
RMS	1.919e+05

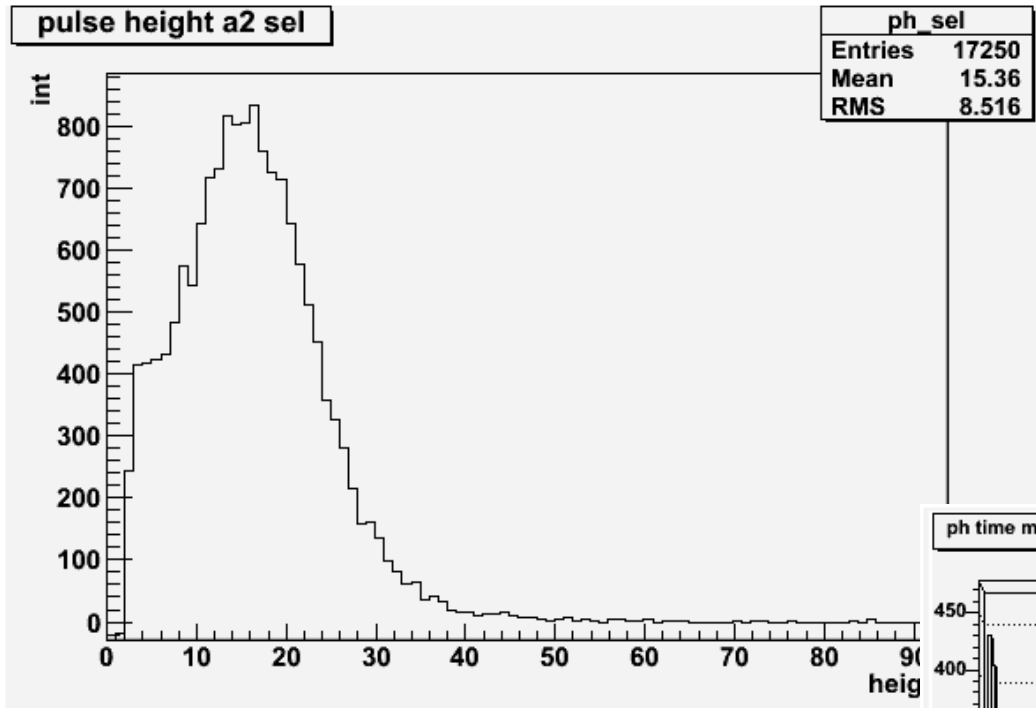


ch 330

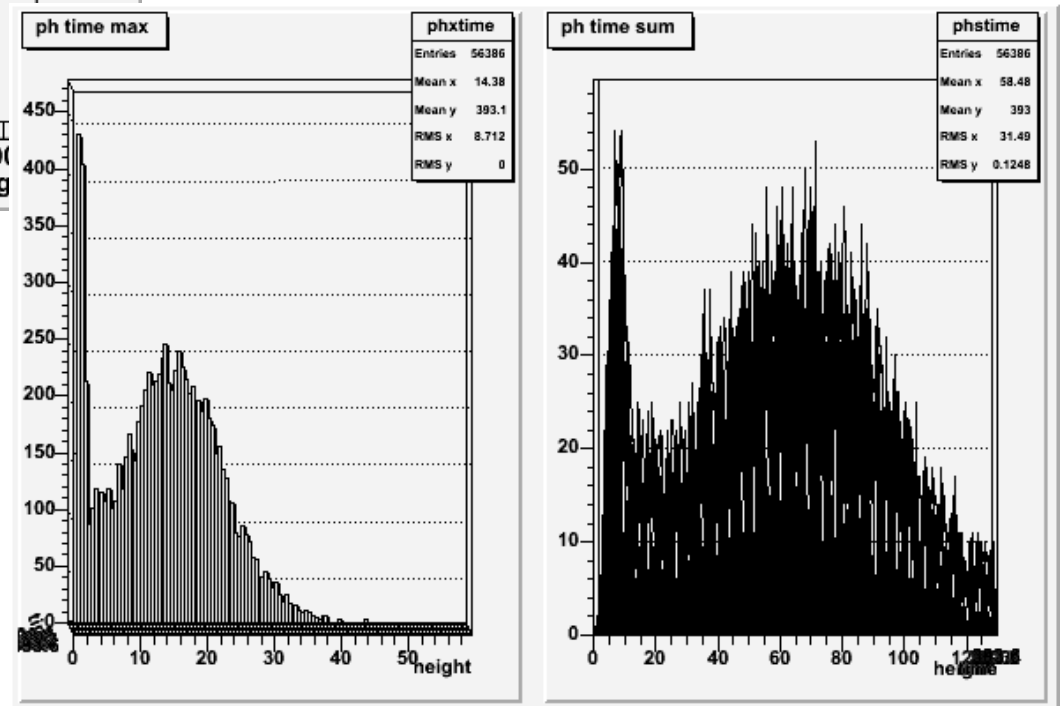
time330	
Entries	664761
Mean	3.117e+05
RMS	1912



# tests of DAQ



3 x moving average



for s.p.e.

Peak to Valley  $> 2$

$\sim 5$  with tight time cut

# tests of DAQ



use HD-DAQ with Struck FADC and DODI with 9 PMT  
and old Ge-Diode with pulser

check front end & triggering





# summary

---



Cerenkov muon veto installed

**Markus Knapp** & **Florian Ritter**

splitter boxes & HV & analysis

tests with HD-DAQ (T. Kihm) & DODI

WLS fibers for plastic veto (DUBNA) arrived in Tü



# VM2000 foil

---



comes in rolls of 1,2m width and 45m length

- ◆ self-adhesive foil:
  - glue does not dissolve
  - holds on SS surface
- ◆ fixed by washers / nuts
  - distances 1,3 – 2 m
- ◆ secured by SS wires
  - running horizontally at 3 heights
- ◆ clamped by the PMT mount and cable holders

# unloading and entering the WT

---



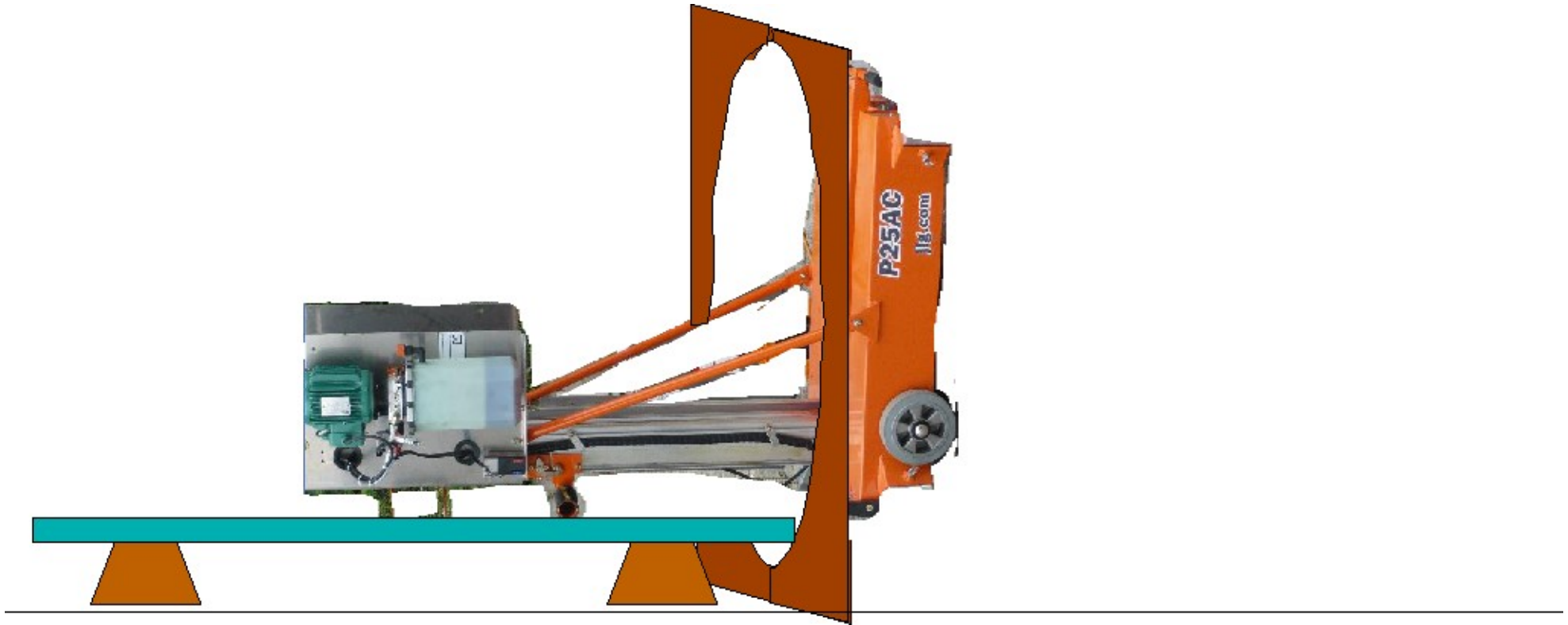
# unloading and entering the WT

---



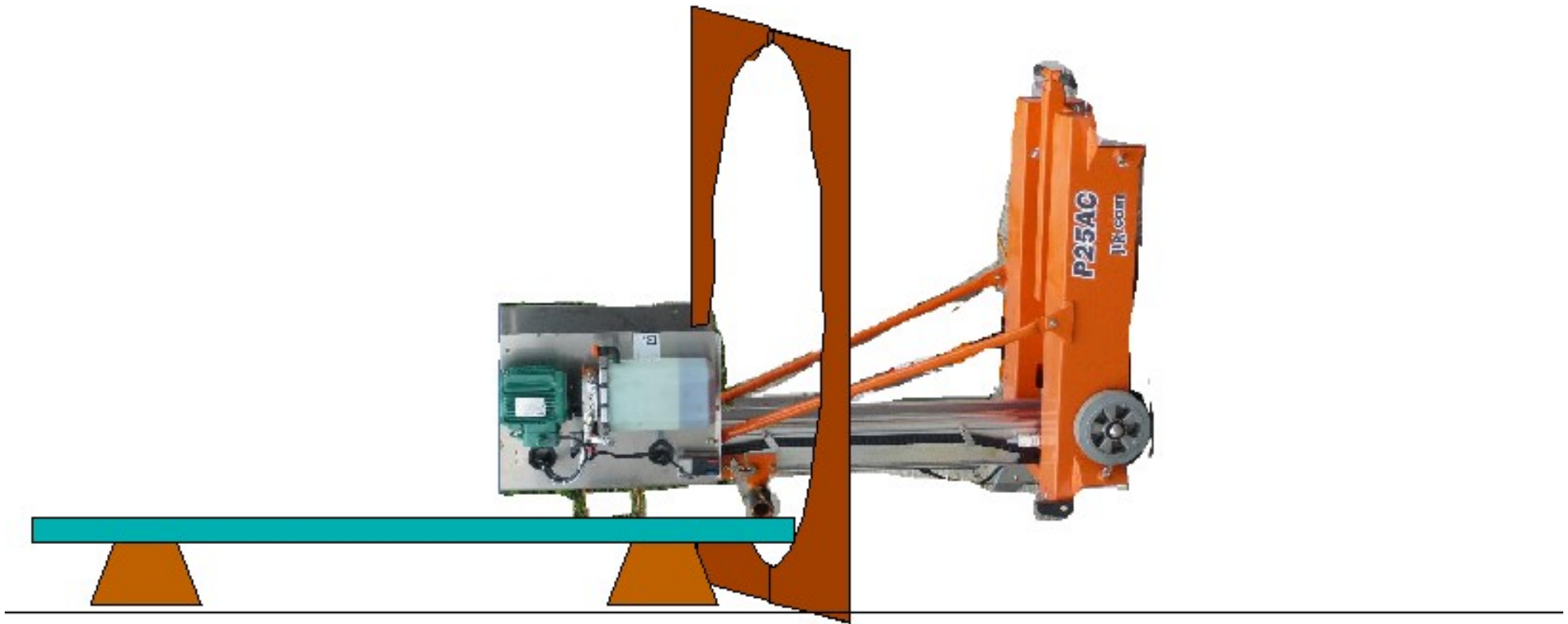
# unloading and entering the WT

---



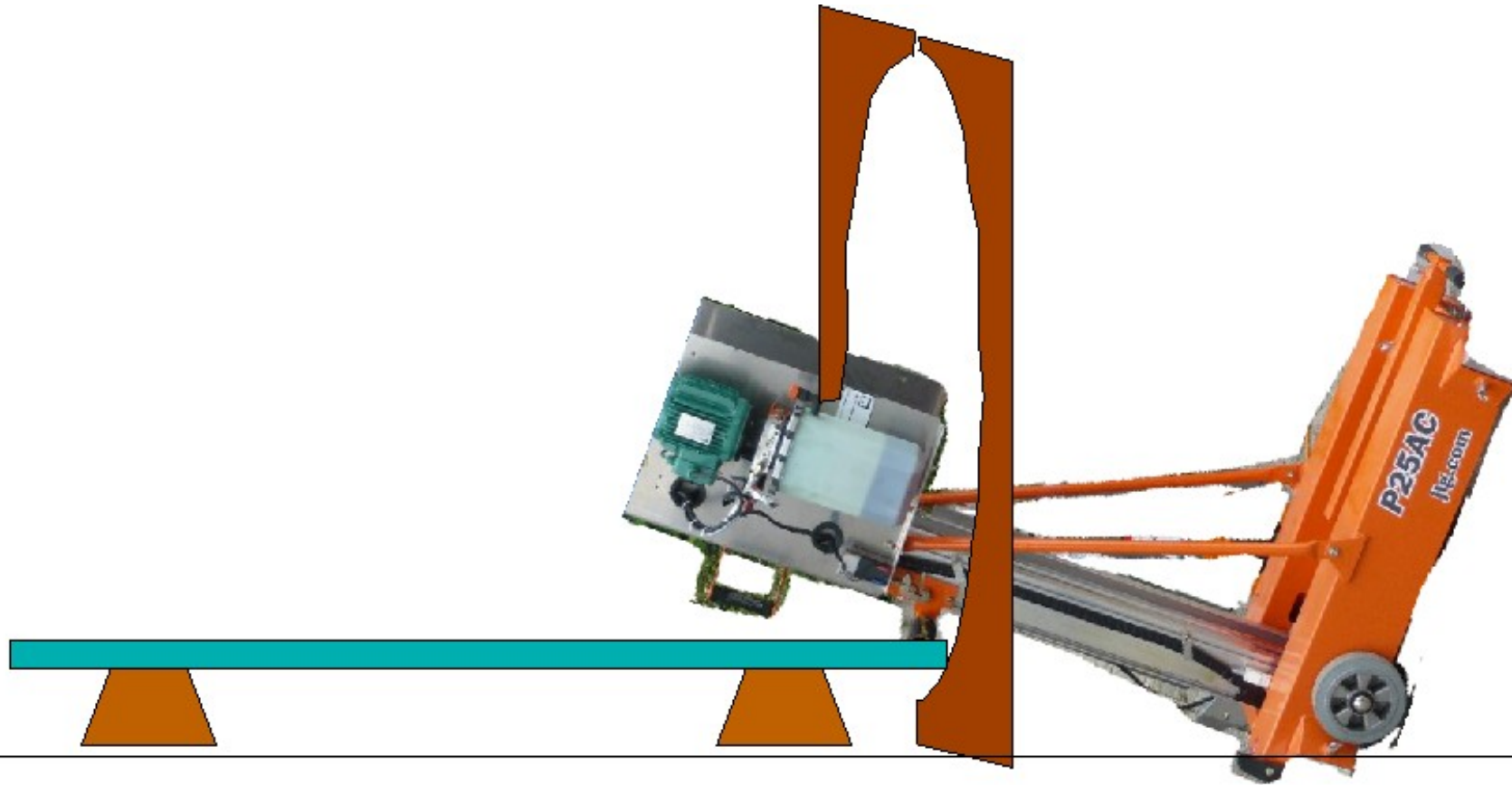
# unloading and entering the WT

---



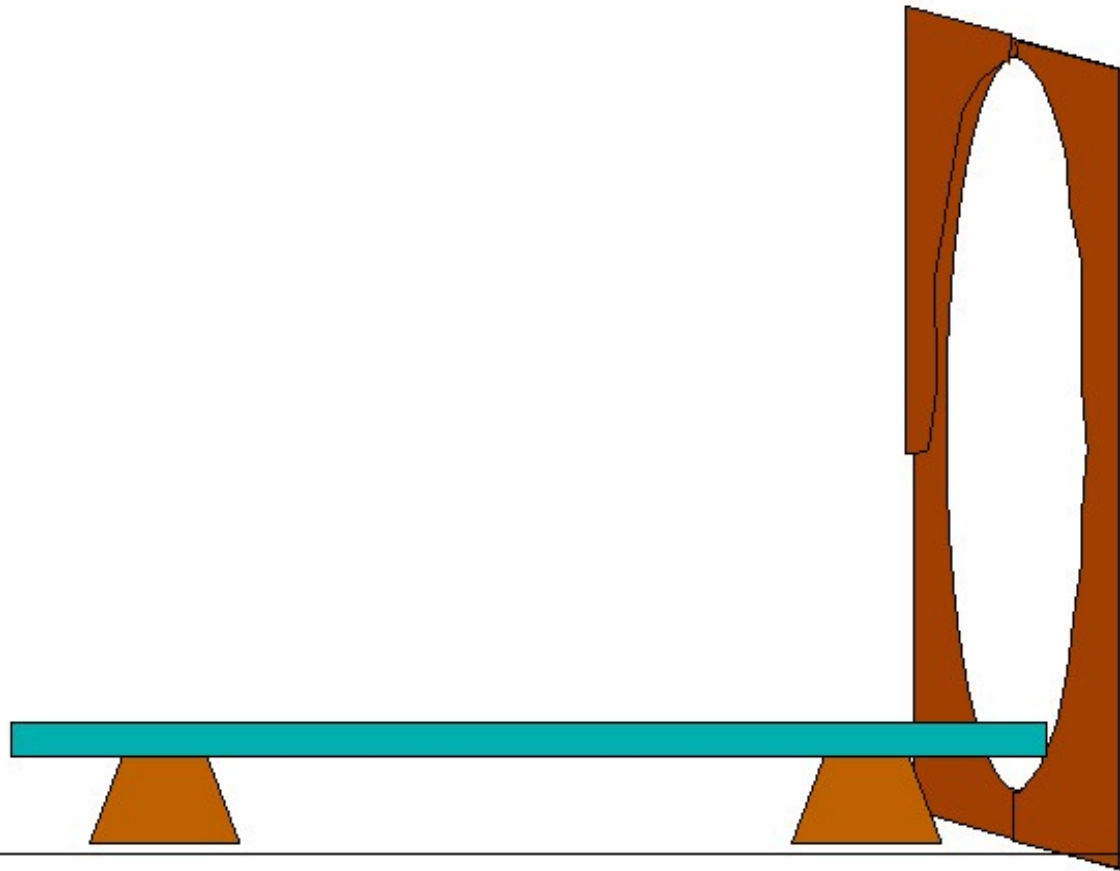
# unloading and entering the WT

---





# unloading and entering the WT



# studs for PMT on floor of WT

