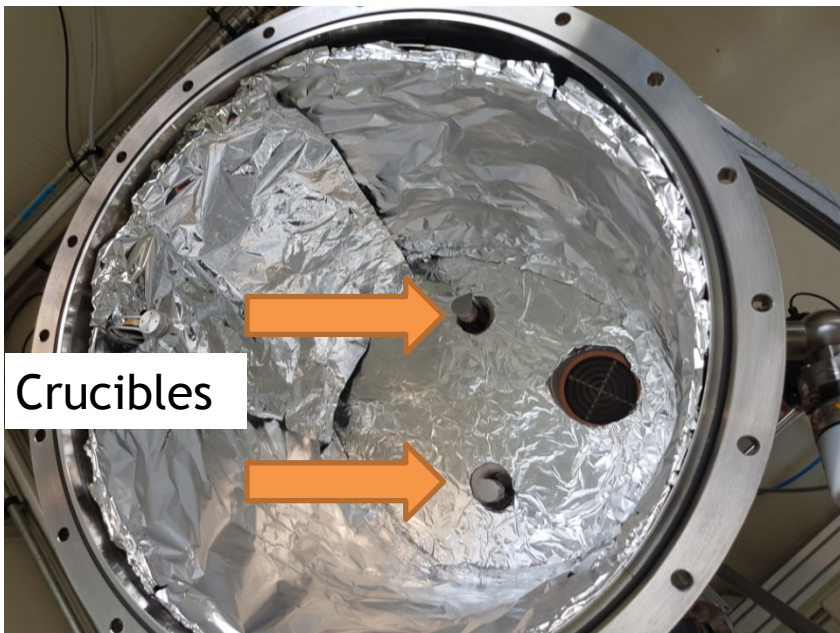
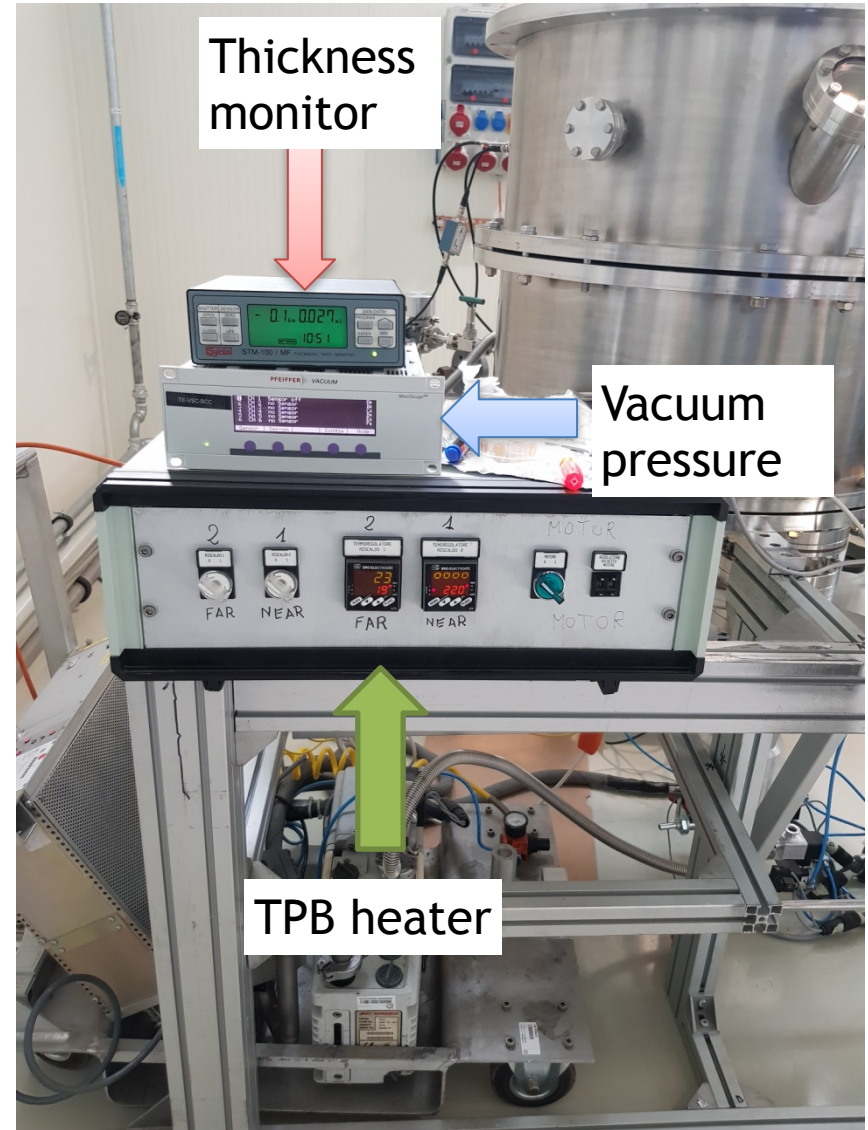


PMT Coating Status

César Jesús-Valls

IFAE

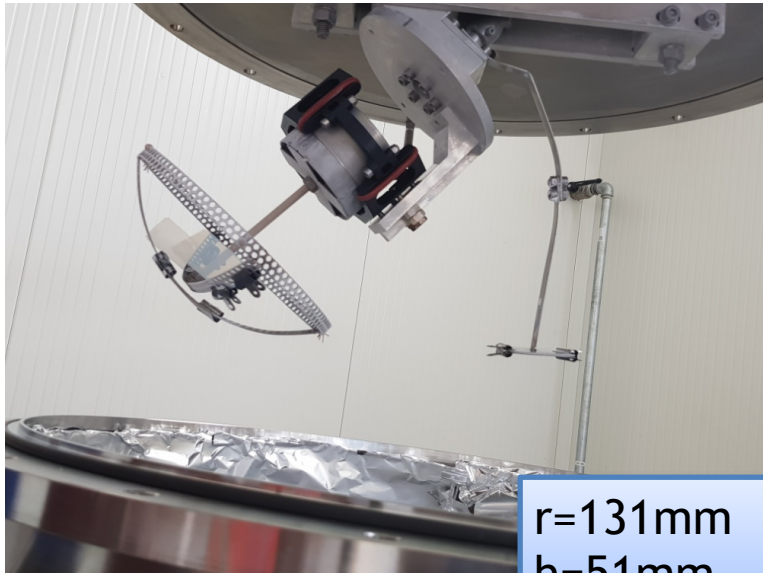


Crucibles

Thickness monitor

Vacuum pressure

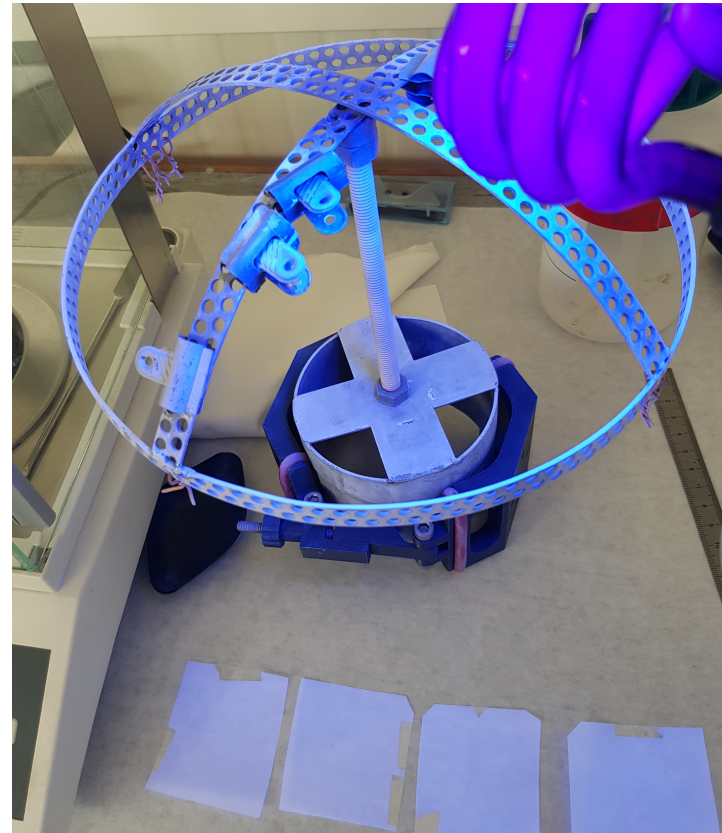
TPB heater

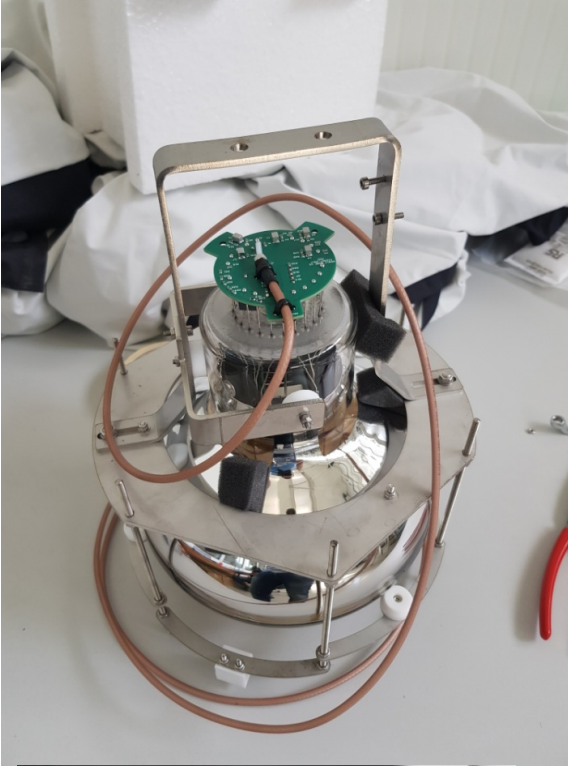


$r=131\text{mm}$
 $h=51\text{mm}$

- test samples also useful for thickness calibration
- all PMT have been coated with more than $0.2\text{mg}/\text{cm}^2$ in the middle.
- maximum difference in thickness is expected to be $<20\%$ from the extreme edge to the middle (middle-center $<5\%$).

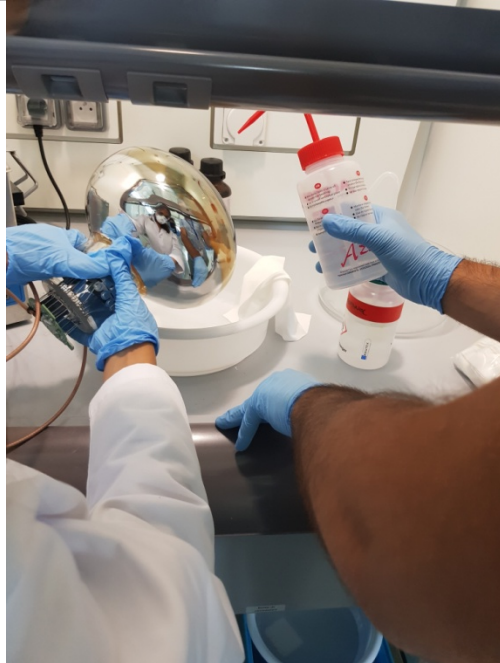
- test sample coating to test the system after transport and to learn
- spend 1.5 weeks on learning process
- easy but annoying job





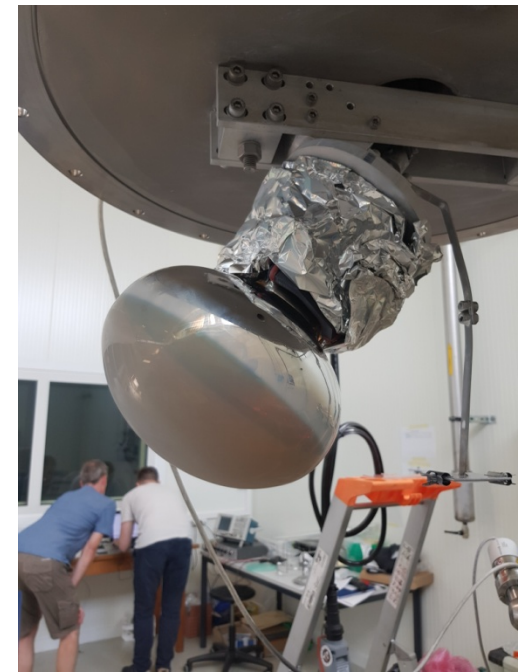
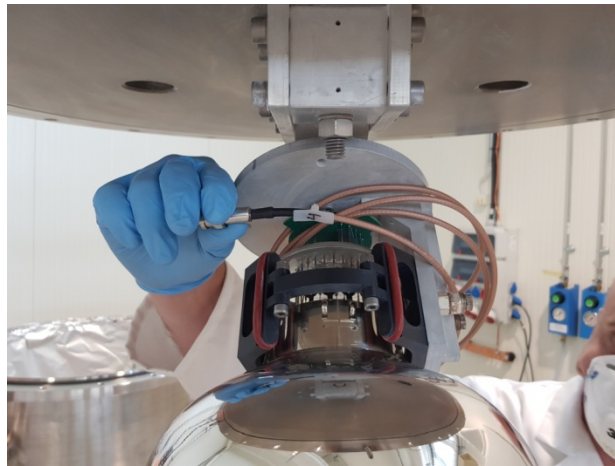
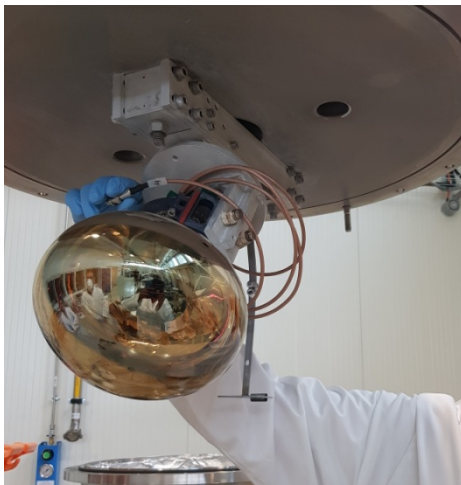
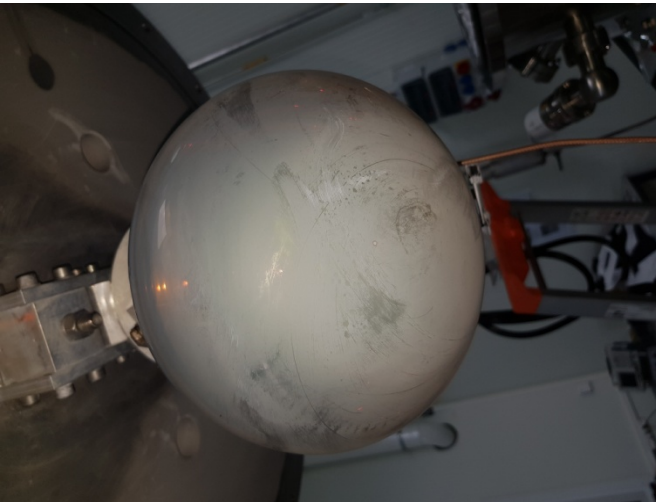
Procedure

- visual inspection of box => all fine
- PMT was left in box, HV cable was taken out, the box was covered with black sheets
- Dark count test at 1200 V => all fine
- Photo from PMT outside box to have reference for PMT orientation
- dismanteling of the PMT+support
- cleaning of the PMT surface with acetone and isopropanol + drying the surface => **crucial for good coating quality**



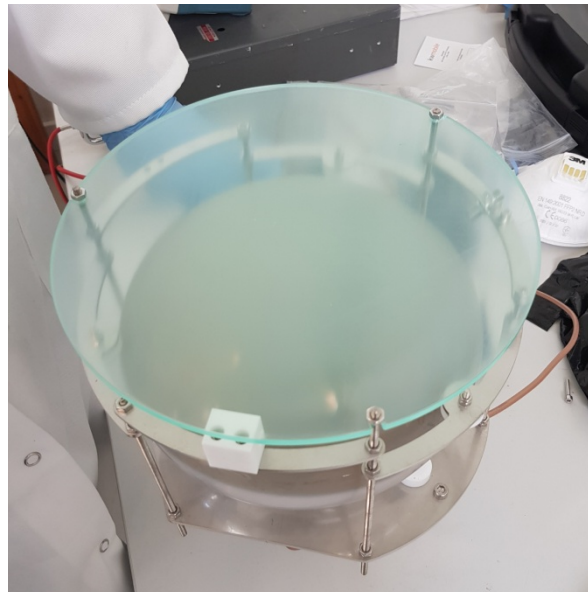
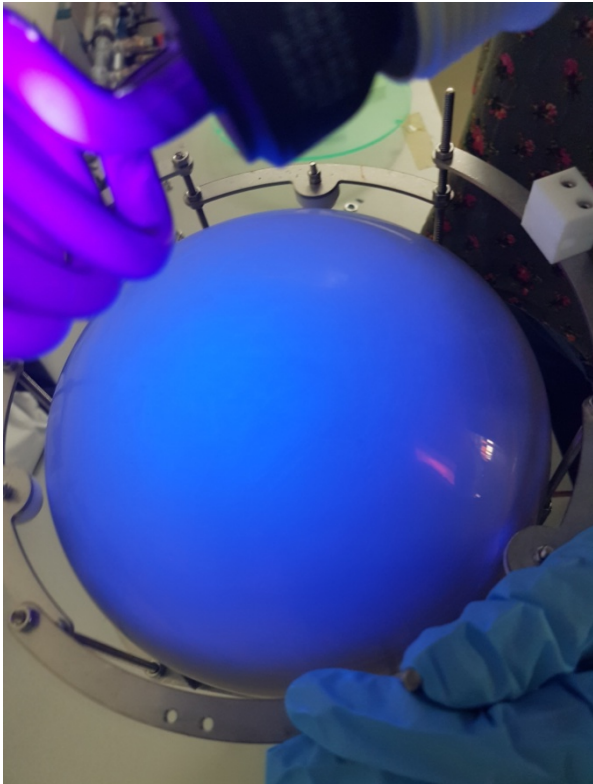
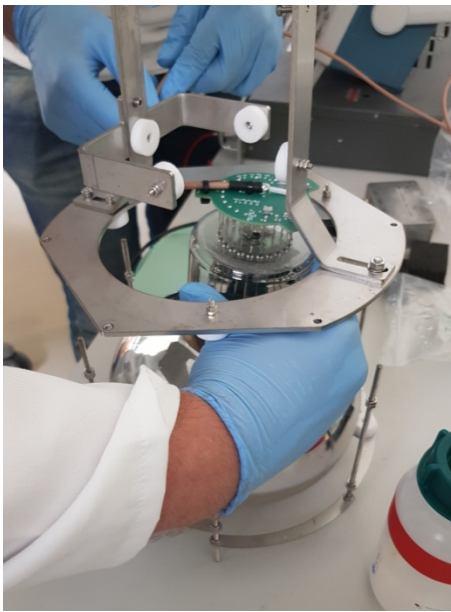
Procedure

- Fixing the PMT in the vessel
- Placing carefully the cable so that the PMT can rotate
- cover cable and base with alu foil
- pumping down to below $3 \cdot 10^{-5}$ mbar
- heating up TPB to 220 C monitoring every minute the parameters



Procedure

- Re-assembling of the support structure with PMT
- checking coating with UV lamp + photo
- adding acrylic plate to protect TPB
- place in box with silikat gel to keep dry => 35 of 40
- Dark count test after coating



Q_{eff} Measurement

- 40 PMTs now stored in EHN1
- 4 PMTs will be brought back to Meyrin for Q_{eff} measurement
- producing missing part currently => after 7th of September
- only >200 nm and quantitative not qualitative
- trying to contact ICARUS group to explore possibility to measure at 128 nm
- not clear if setup still exists

Absolute QE measurements

from Thin Film & Glass lab

<http://cdsweb.cern.ch/record/1164394/files/PH-EP-Tech-Note-2009-001.pdf>

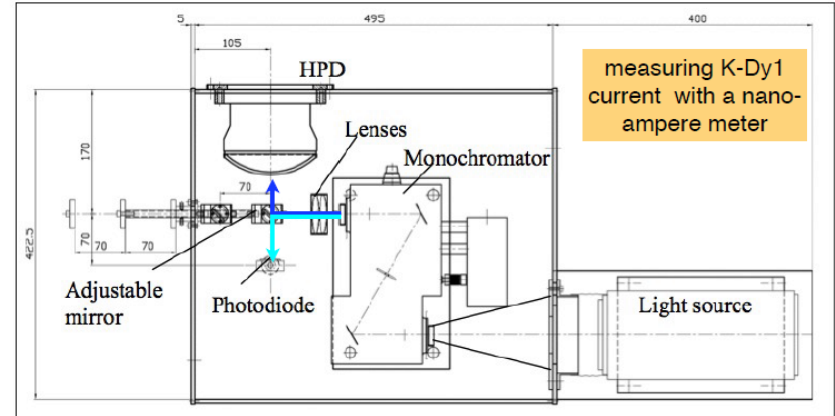
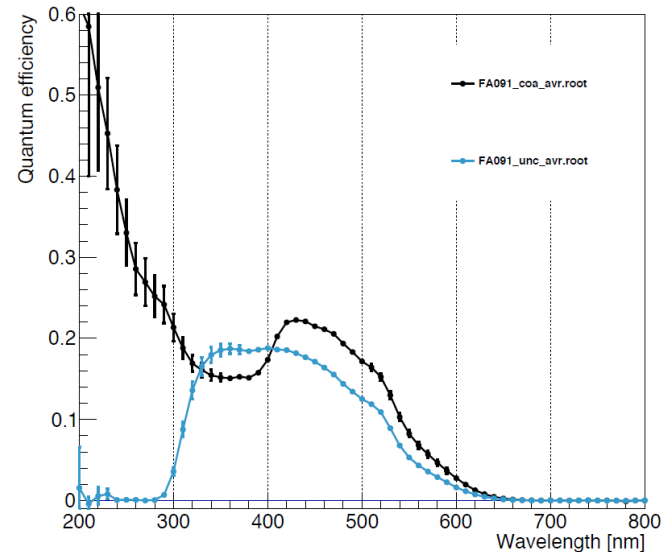


Figure 15: Overview of the mechanical setup of the measurement system. Dimensions in mm.

$$\epsilon_{PMT} = \frac{I_{PMT}}{I_{PD}} \epsilon_{PD}$$

Sosuke's slide
@ArDM meeting



Summary + Outlook

- 40 PMTs were coated with ICARUS facility at CERN
- 2 PMTs/day coated (ICARUS w/o base 4 PMTs/day)
- Learned a lot:
 - Drying process after cleaning crucial
 - PMTs ideally stored after coating in sealed Mylar/Alu bag
- Visual inspection with UV lamp fine
- Open question: Surface preparation => ArDM seemed to have no preferences but ICARUS sand blasted all 360 PMTs
- Trying to organize Qeff measurement at 128 nm
- PMTs at EHN1 waiting for installation

Cesar, Danaisis, Paula and the coating vessel

