

Intervention on T600 cathode panels at FNAL

A. Zani - CERN - 18/10/2017

Report on the intervention on cathode panels

After arrival of the detector at FNAL (July), a preliminary inspection showed that some screws keeping in place the cathode plane had come loose and fallen to the ground:

→ a second detailed inspection was planned, aimed at better checking the full detector conditions

October 9-19, a team of INFN/CERN personnel comes to FNAL for the intervention.

- Francesca Stocker, Filippo Vercellati, Andrea Zani

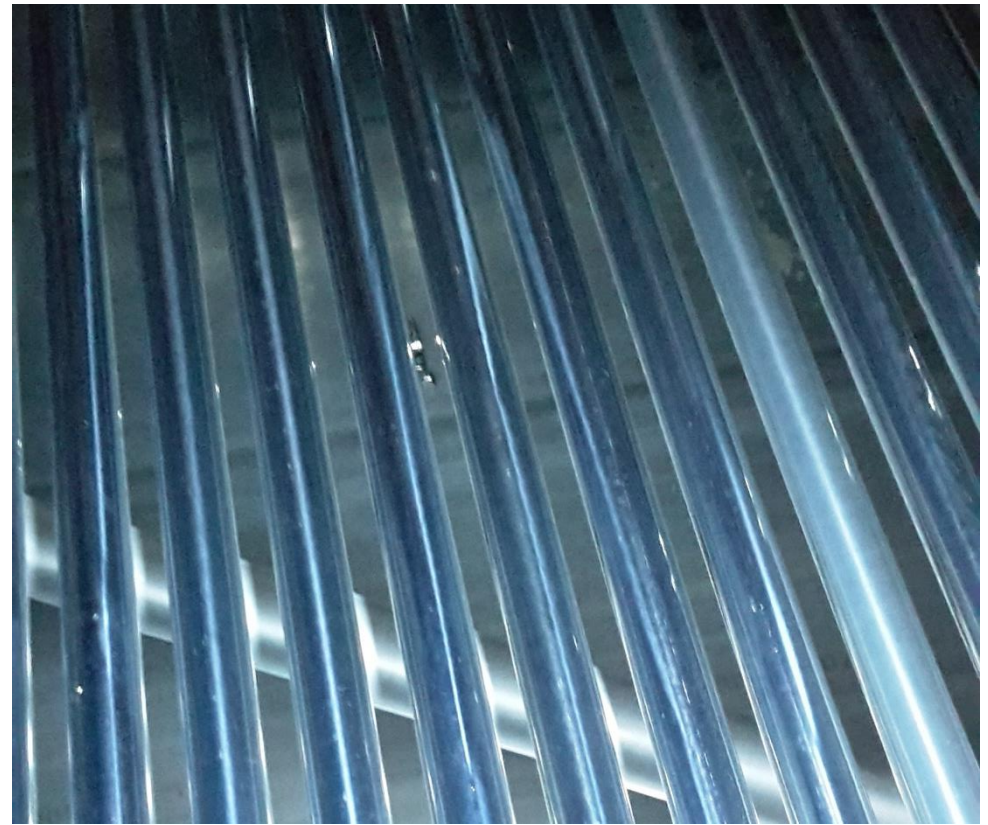
The loose screws are recovered and put back in place, while all other screws are double-checked.

- A day of work per cold vessel was enough for this specific operation

Report on the intervention on cathode panels



View from the man-hole of the race-tracks removed to access the drift volume.



Example of a screw fallen through the horizontal race-tracks to the vessel floor:

- recovered with grabbers*

Detailed inspection of the detector

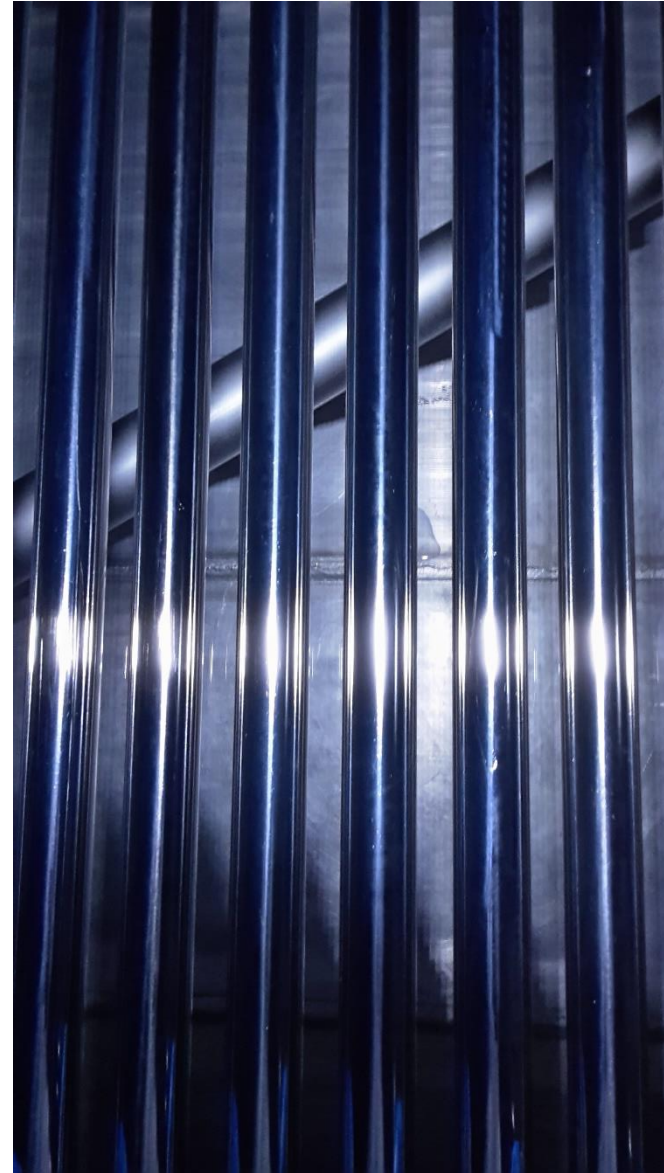
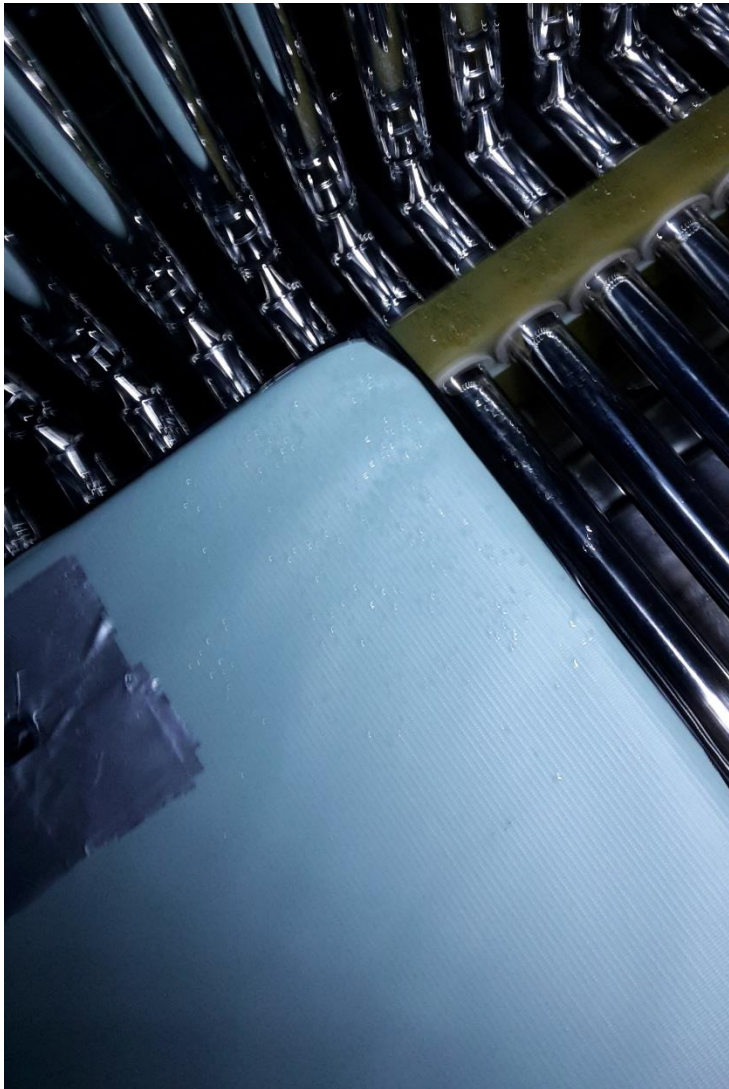
A more detailed inspection was carried on, while entering the drift volume in order to restore the cathode panels.

Some minor inconvenients were found in both detectors. They were tackled and solved when possible (see next slides).

A more significant problem was found on vessel #2 on Thursday the 12th : water on the floor of the container, in three points along the detector length.

- Water was absent on the first inspection on Monday 9th.
- Heavy rain on Tuesday 10th (and Wed. 11th)
- Rain filtered into the container due to a failure in the cover of one door (most probably due to previous episodes of bad weather)
 - **SOLVED**: the detector floor was dried and cleaned in two days, and new covers were installed on both doors of the two cryostats.
 - New covers "heavily tested" by very intense rain in the Chicago area on Saturday 14th: → on Sunday the detector was perfectly dry.

Water leak



Smaller issues – both vessels

The soap for the cathode panels cleaning could not be entirely removed before installation, because it was unreachable. It remained in the frames of the panels. It came out due to bumps during the transport.



Vessel #2 - Dry stains on the vessel floor



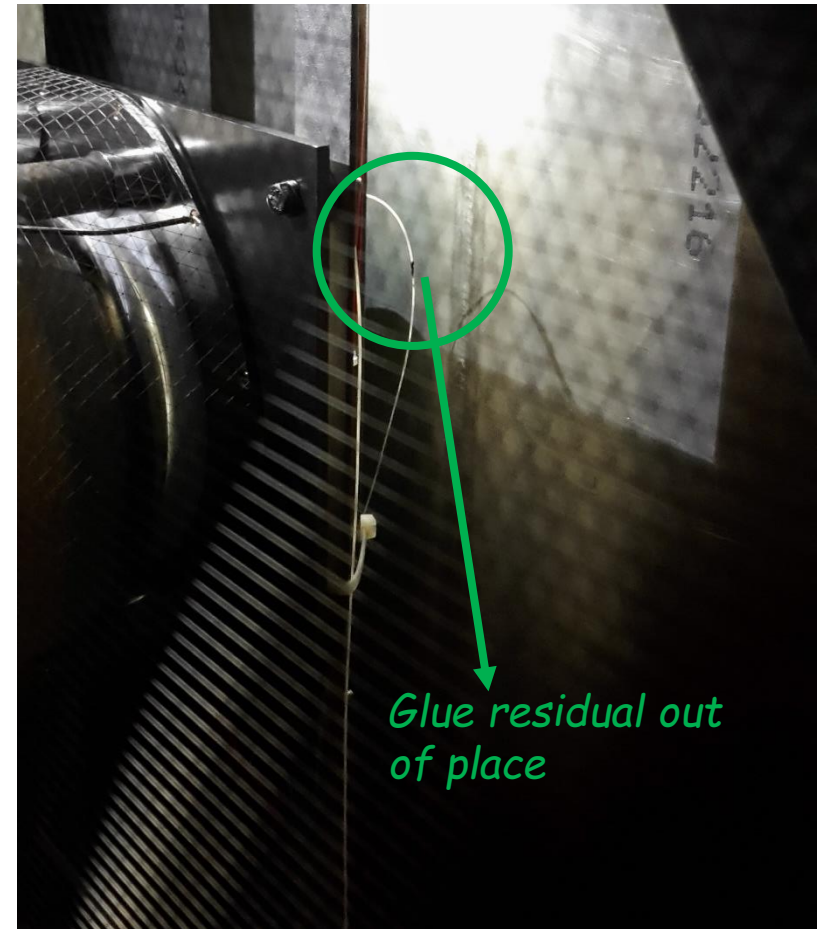
Vessel #1 - Dry stains on the panels

Soap cannot be removed with alcool. It should not pose any threat, but it will be cross-checked in LAr at CERN.

Smaller issues – vessel #1

*Three fiber-holding pipes found to be not in place (i.e. not pointing towards the PMT centre)
One fiber got loose and it is not coming out of its pipe any more.*

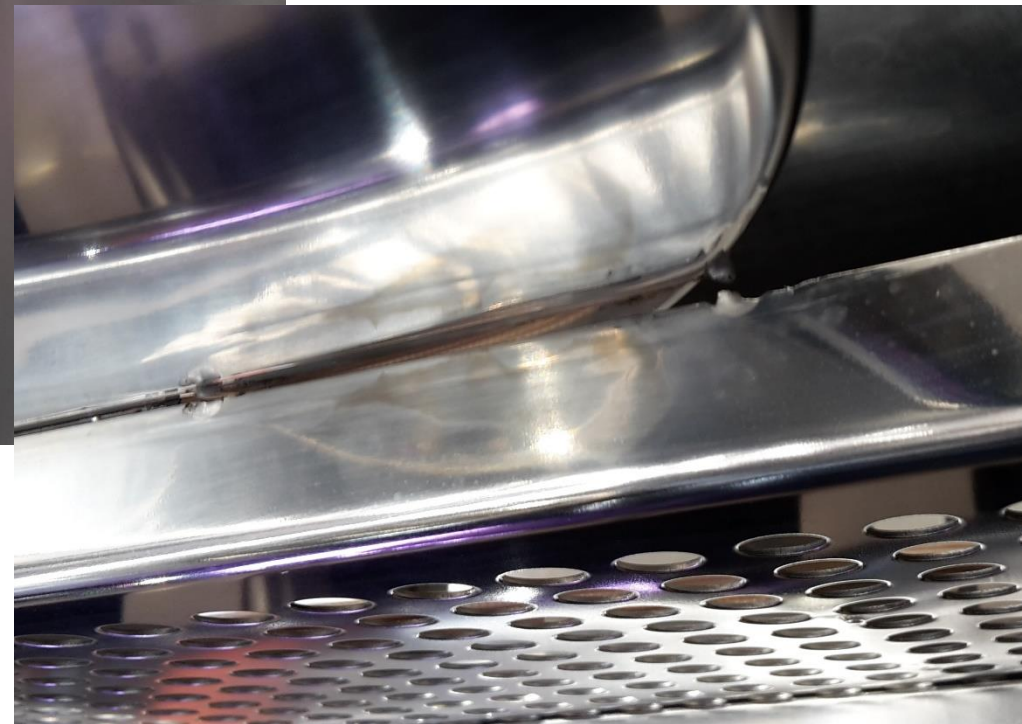
It may not be possible to calibrate such tubes.



Smaller issues – vessel #1

Disk around the HV feedthrough, above the HV cup, fixed with six welding points on the most external part of the ground plane. Three out of six welding points broke, making it unstable.

Re-stabilized by gluing it in place on the ground plane, with special glue, working at cryogenic temp.



Next steps

- Intervention on cathode panels went well and no further actions on that are foreseen
- Will verify soap effect in LAr at CERN
- A new protocol must be put in place for the covers around the vessels doors. In order for them to stand the winter, they must be checked and renovated as necessary (even every few days), until a more stable solution can be put in place.
- Cross-check with PMT installation database, to verify which ones will have calibration issues.
- Before closing completely the cryostats, few things remain:
 - Installing the race-track resistors;
 - "Standing" the level meters installed above the ground plane;
 - Removing the ladders