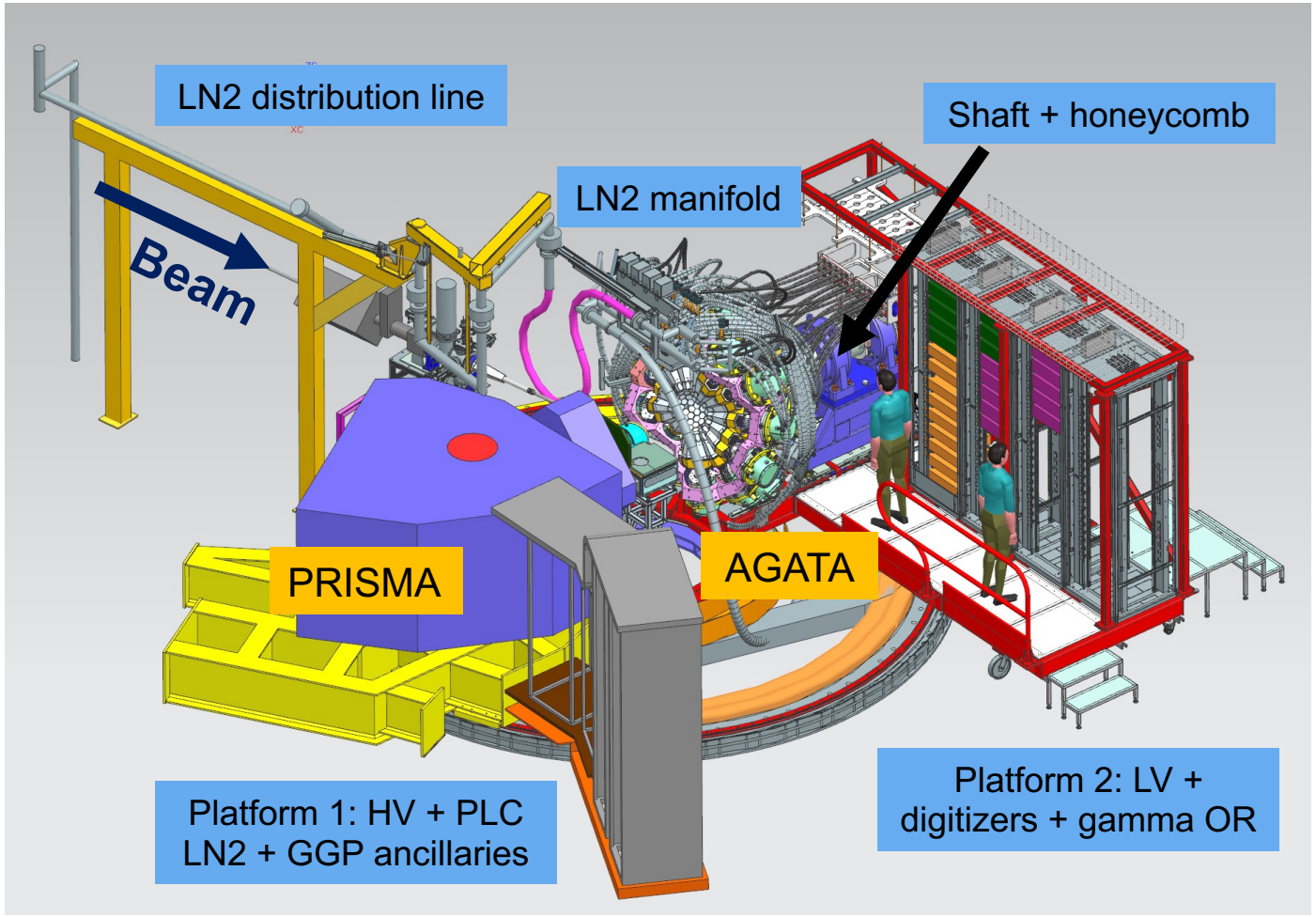
The Infrastructure Team

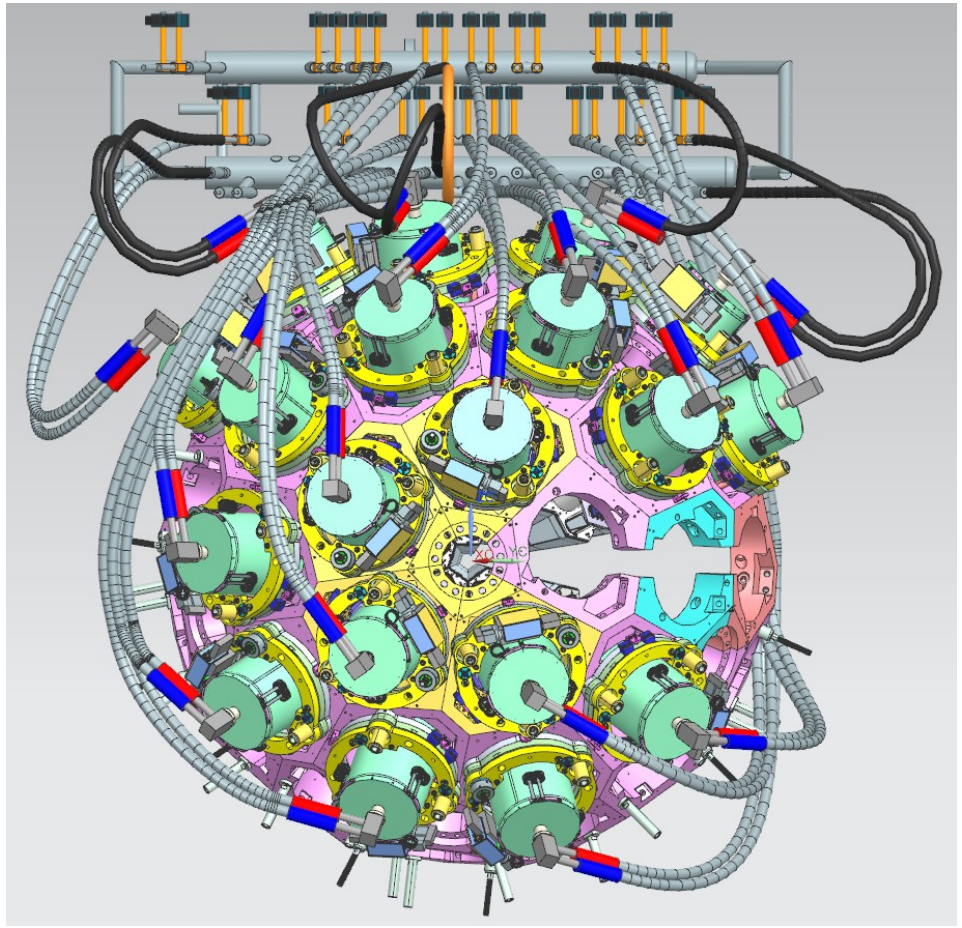
Roberto Menegazzo

INFN – Sezione di Padova

Overview and LN2 hardware



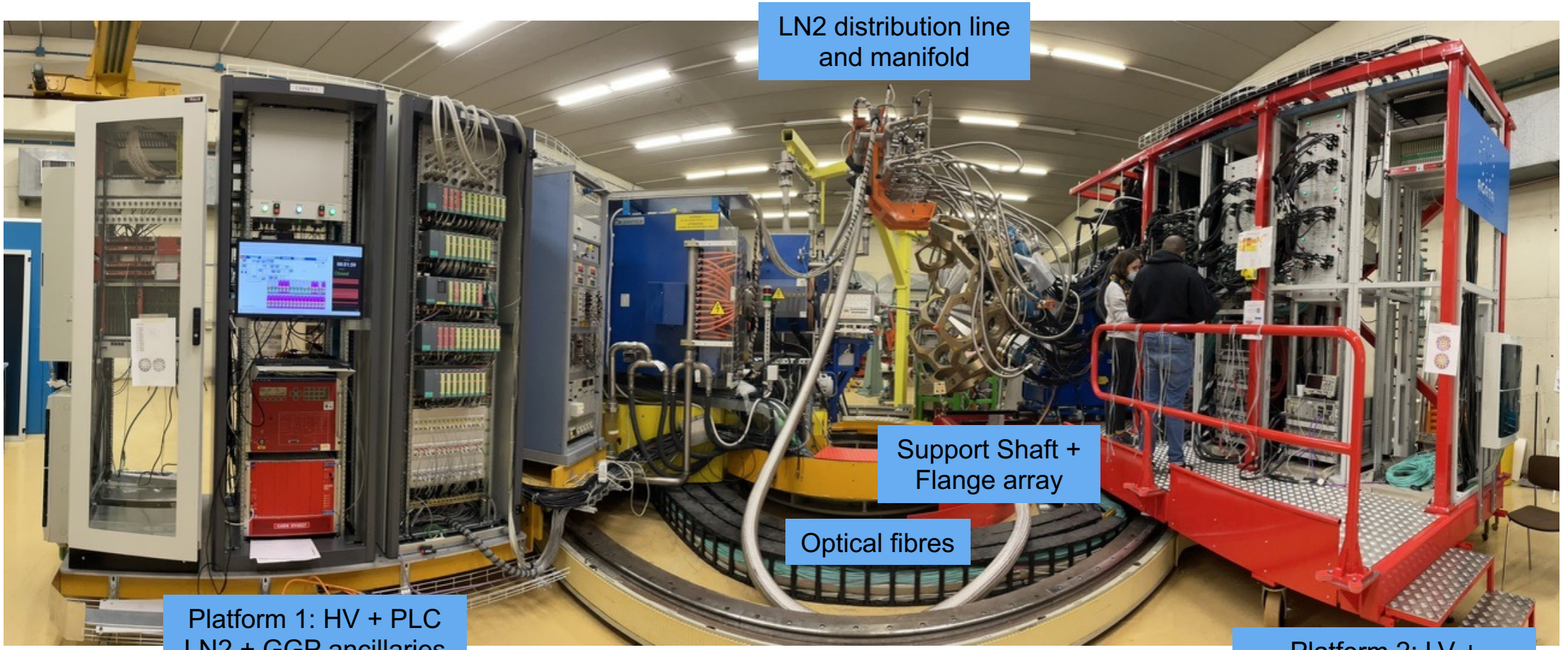
Water, compressed air, new power distribution → installed



Designed in collaboration with INFN - Padova

Extended angular range: rotation from 20° to 110°
(*88 degree for measurements*)
High efficiency configuration: -55 mm
Easy detector mounting: ±85 degree rotation
Targer access: 750 mm translation

AGATA@LNL


LN2 distribution line and manifold
Support Shaft + Flange array
Optical fibres
Platform 1: HV + PLC LN2 + GGP ancillaries
Platform 2: LV + digitisers + gamma OR

LN2 filling system

Identified issues and **adopted solutions**

- Large detector LN2 consumption/evaporation

LN2 filling pressure: 2 bar

- Low opening thresholds of cryostat venting/overpressure valves

Venting valves closed by plastic ties. New calibrated valves ?

- Fragile sealing of level capacitor feedthroughs

Not resolved yet

- Very thin bayonet O-ring

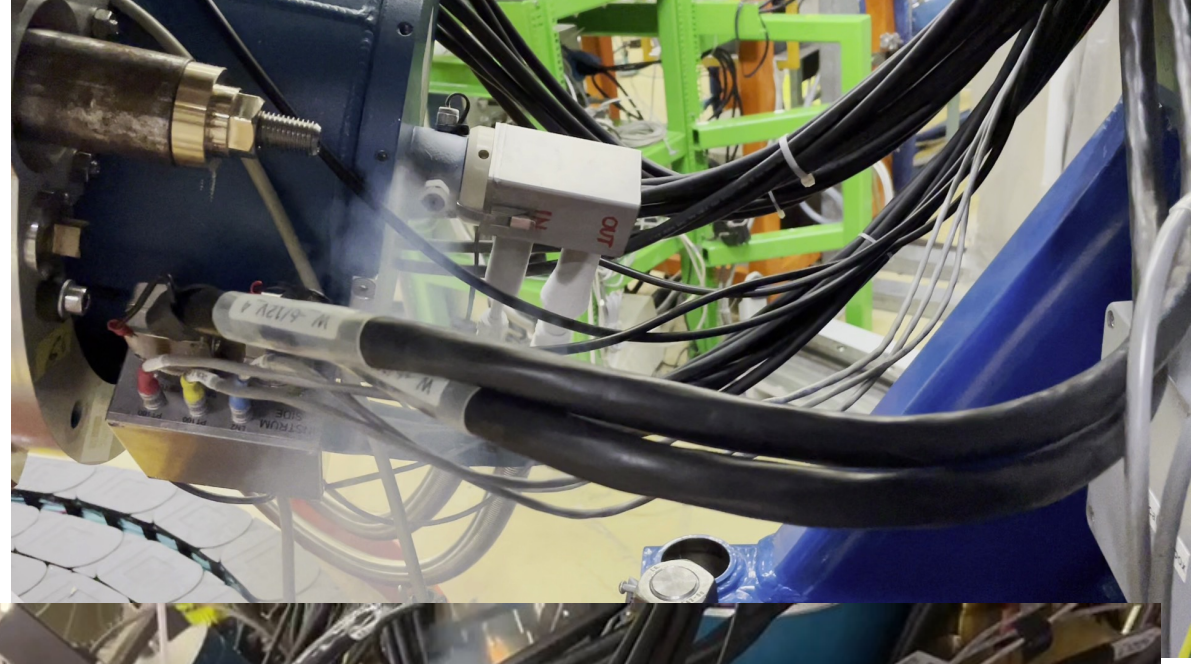
New peek adapter with additional O-ring

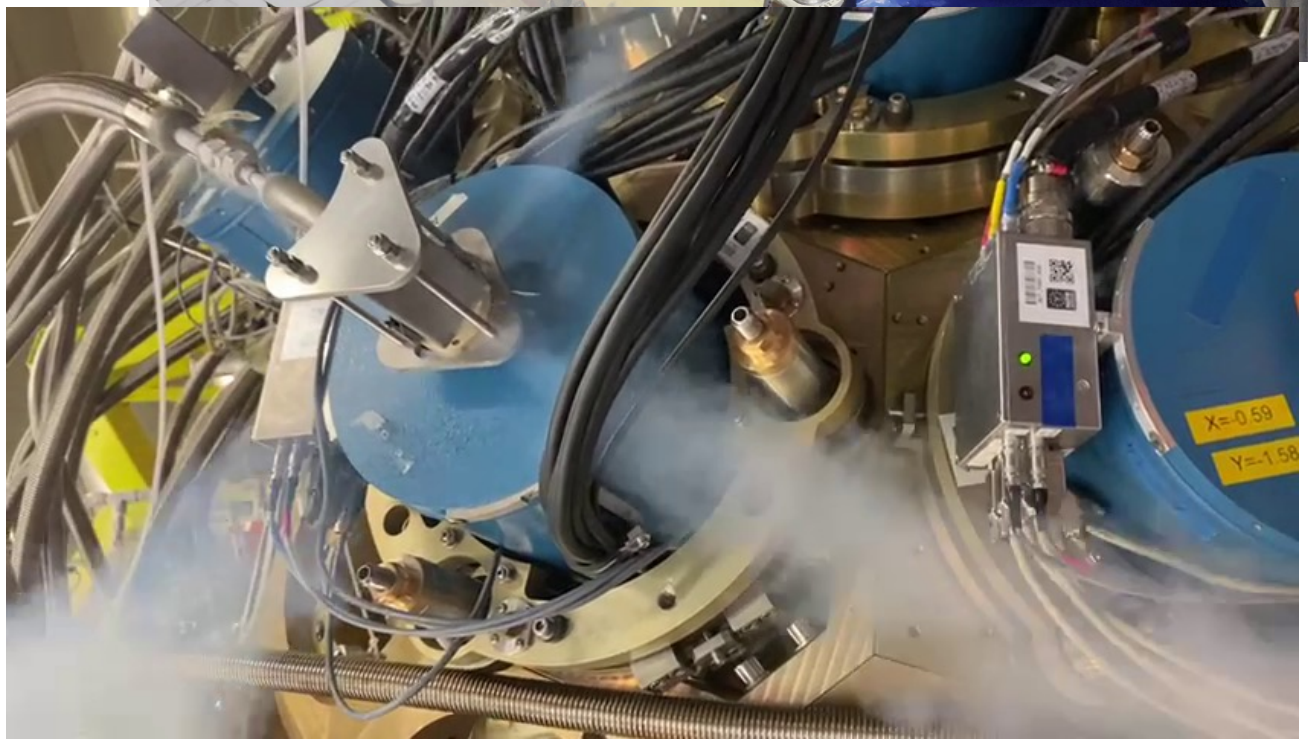
- Rigid metallic hoses

Fixture holding bayonet and metallic hose in place

- Humidity

Additional isolation around the bayonets and improved air circulation

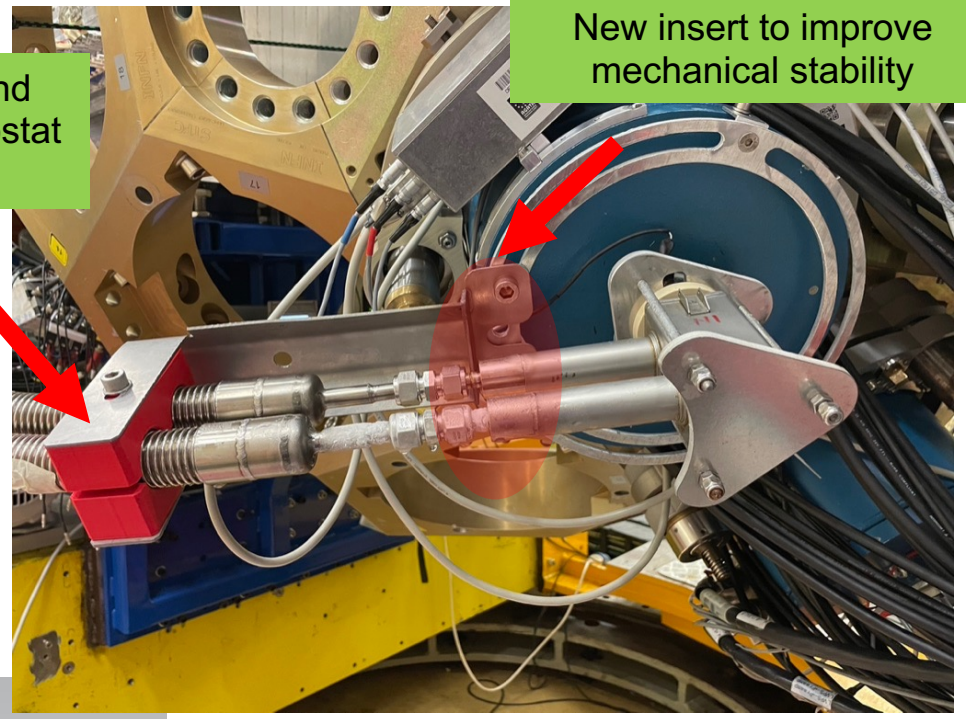


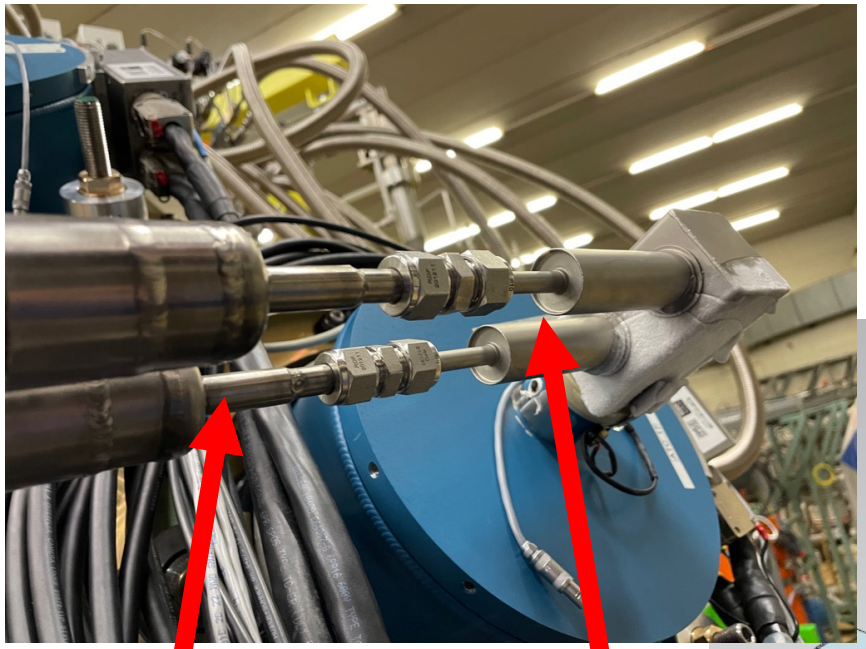


Detector bayonet

Precise alignment and reduced strain on cryostat collar

New insert to improve mechanical stability

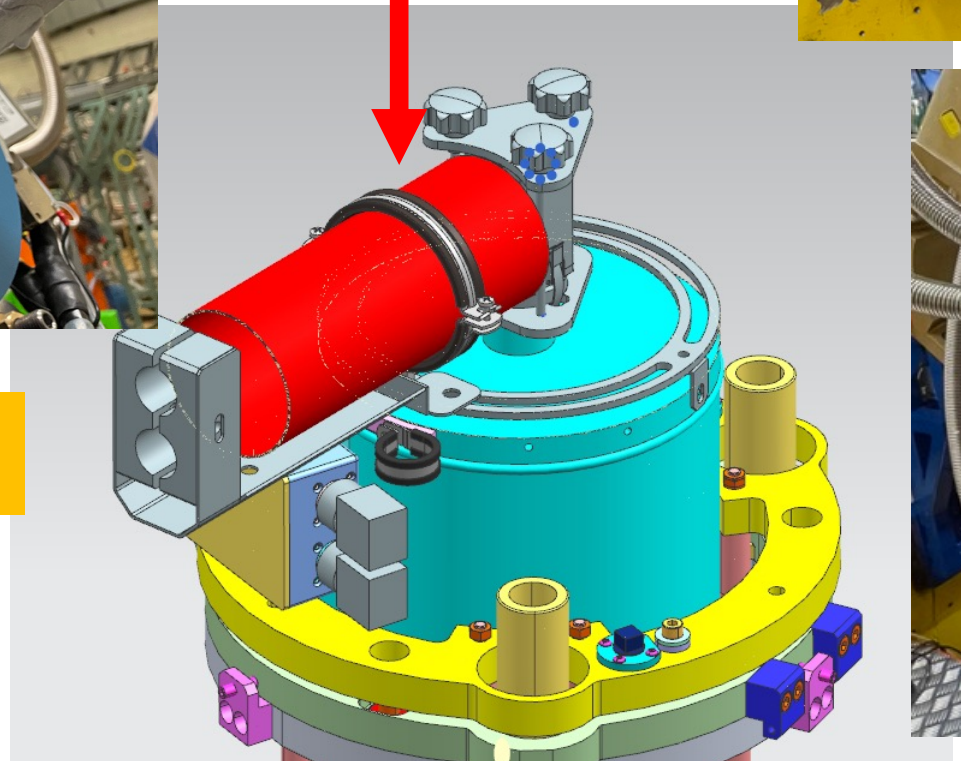


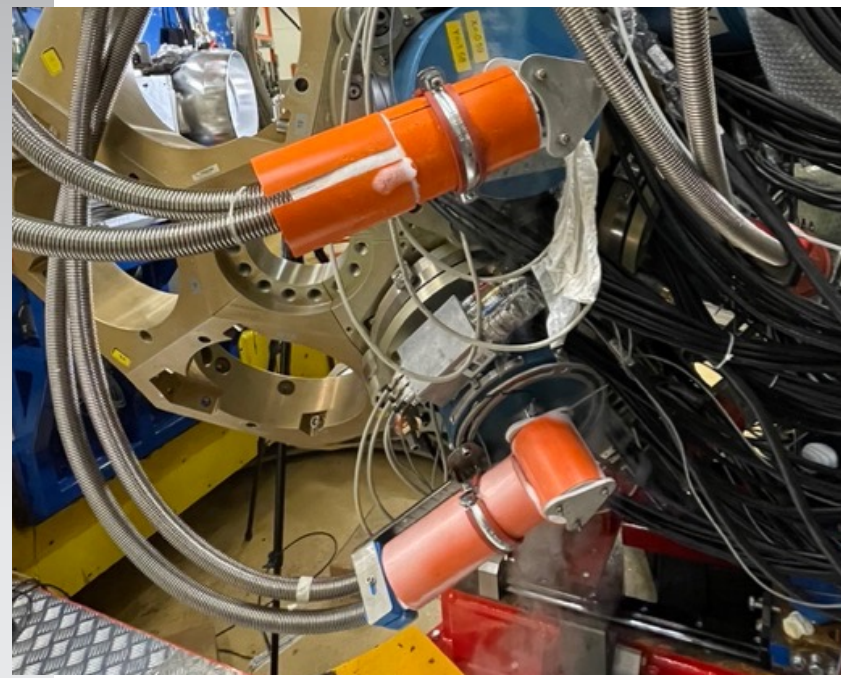


Limited flexibility

Mechanical fragility

Polystyrene insulation



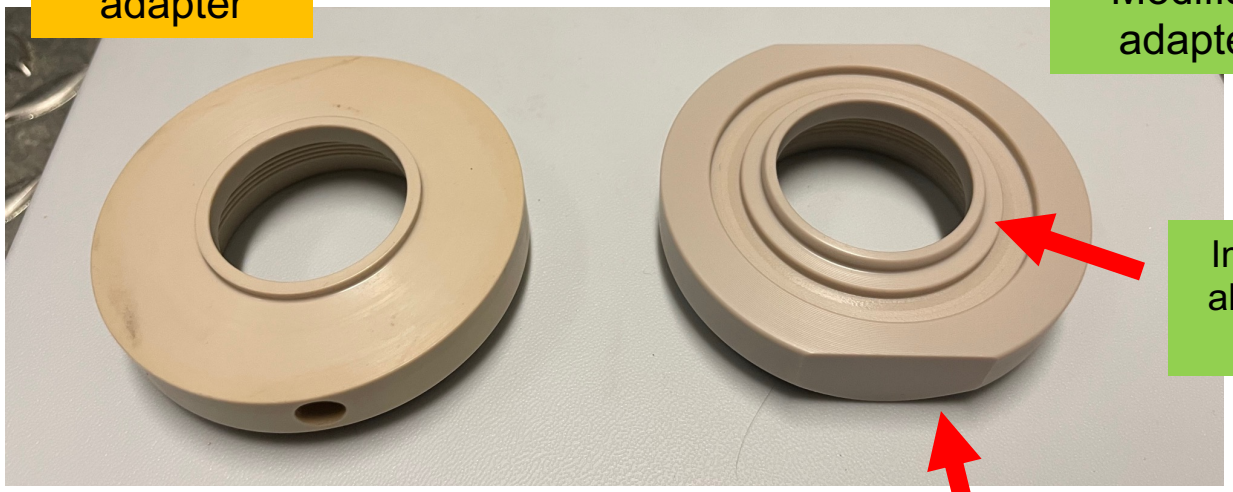


Designed and produced in Padova

Bayonet - cryostat interface

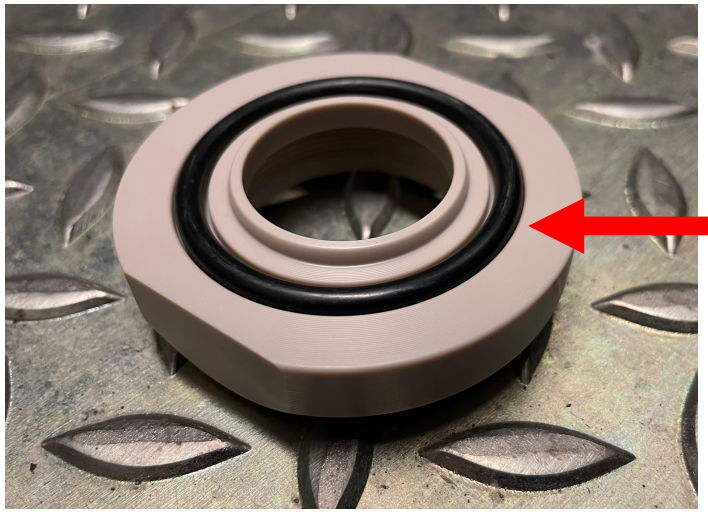
Original adapter

Modified adapter



Improved alignment ring

Standard fixing key

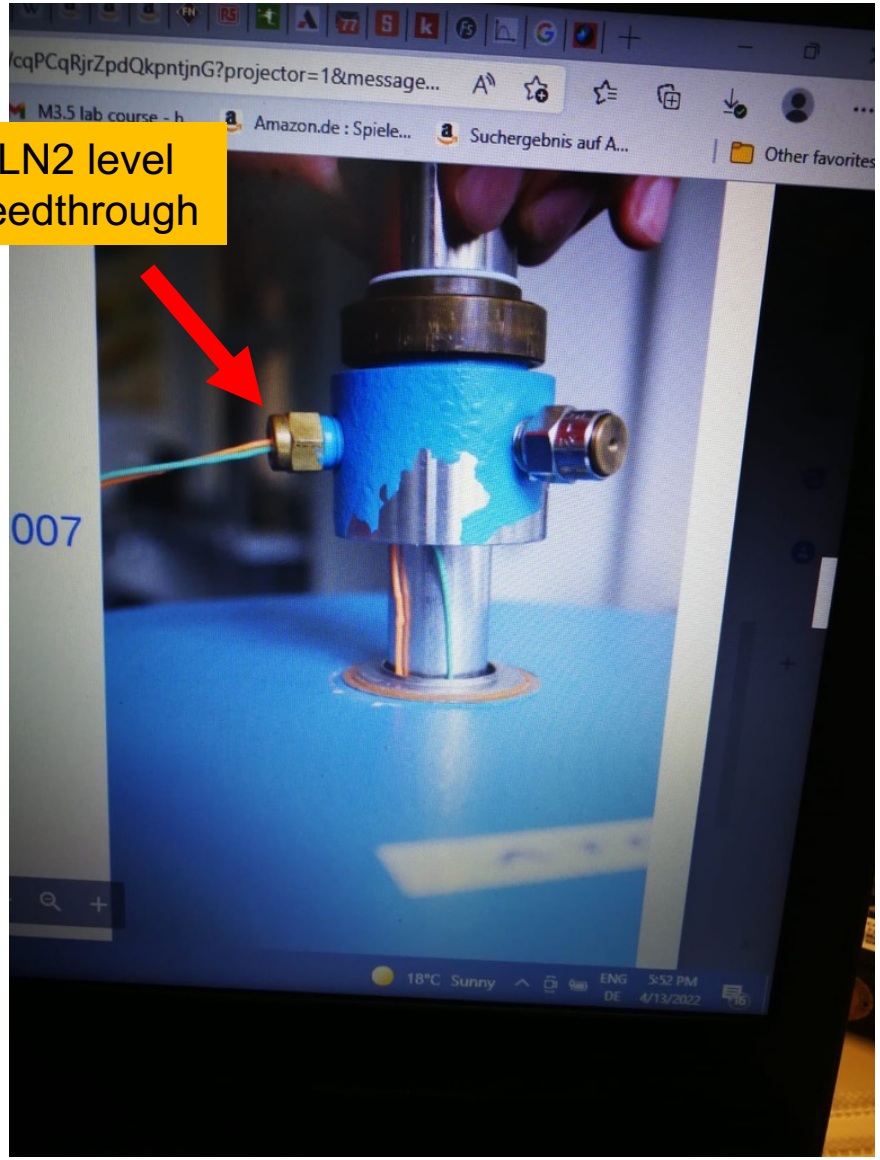


Additional O-ring

Adapter replaced on 10 installed detectors

Designed and produced in Padova

LN2 level feedthrough



How to fix the problem of leaking feedthrough sealant ?

Air circulation

Installed several fans to improve air circulation:
reduced condensation of humid air on cold detector surfaces and lower electronics working temperature

Infrastructure - Detector Support System

LVPS

- Estimated delivery of new LVPS systems: October (1) – December (2) 2023
- Replaced EPICS IOC, updated PLC code and GUI for tank valve and LVPS management by colleagues from Saclay (Arnaud ROGER and Stéphane TZVETKOV @ LNL)

Cables

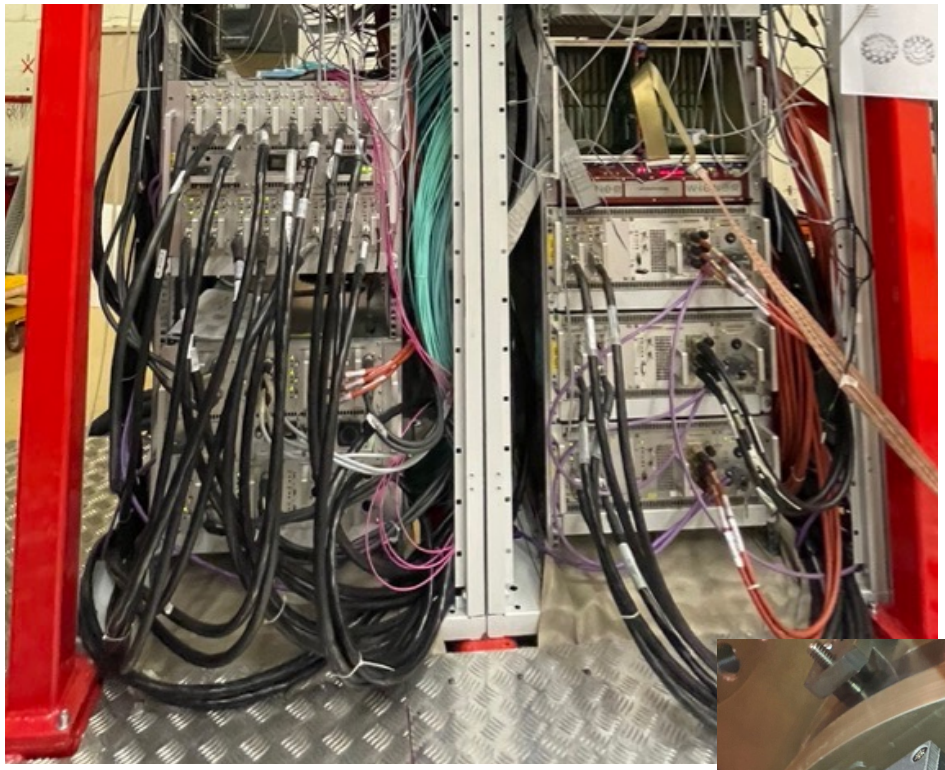
- Few damaged LV cables. Spares available

LN2 system

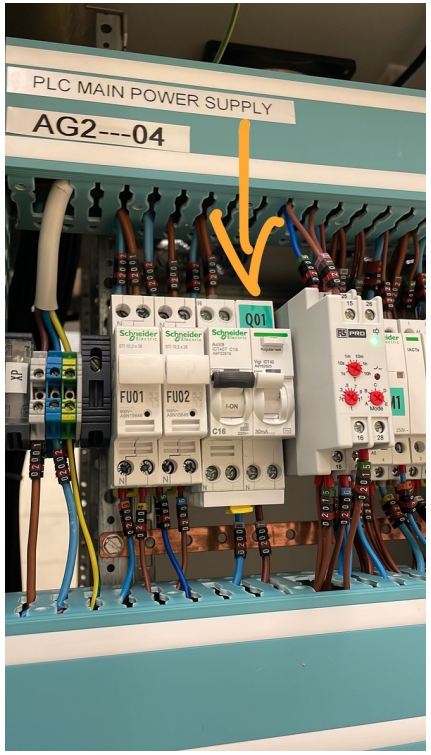
- 9.02 @ 23:35 general power down following circuit breaker activation. Reason unknown

Organisation

- Defined CEA procedures for AGATA on-site interventions

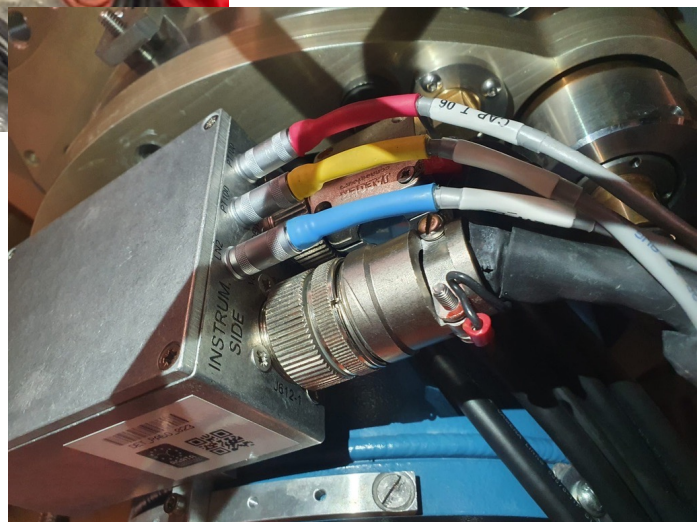


LVPS



Circuit breaker Q01

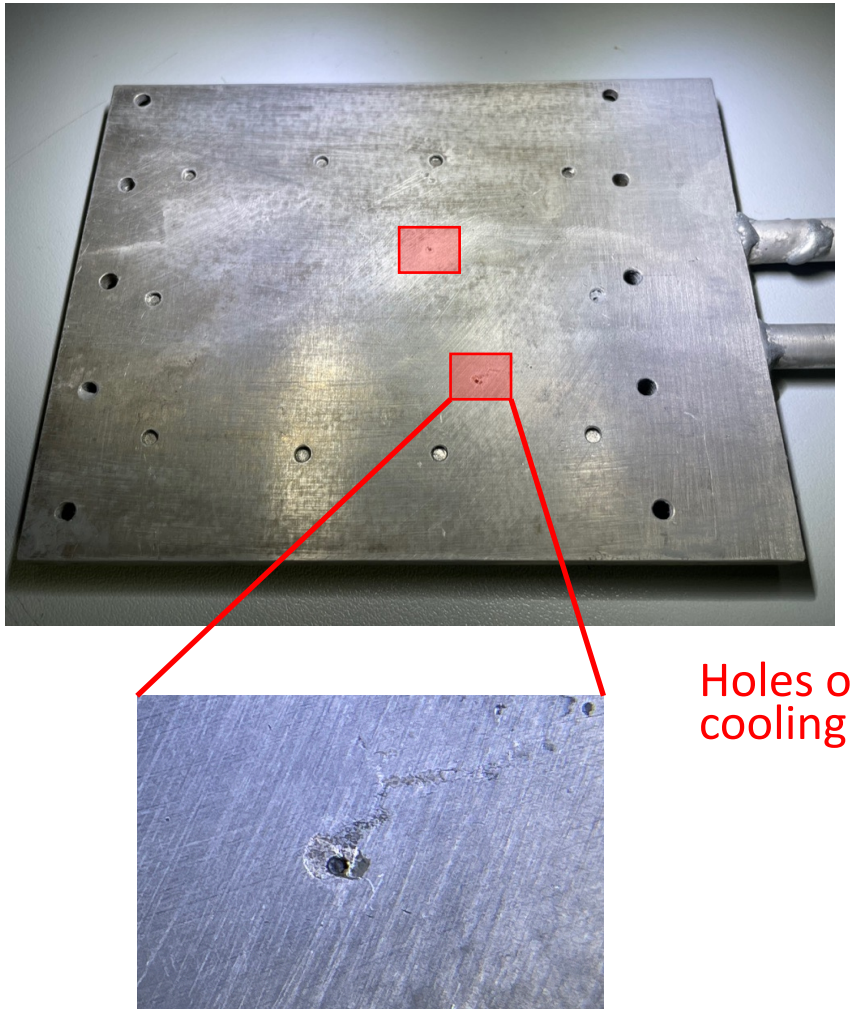
LV cable

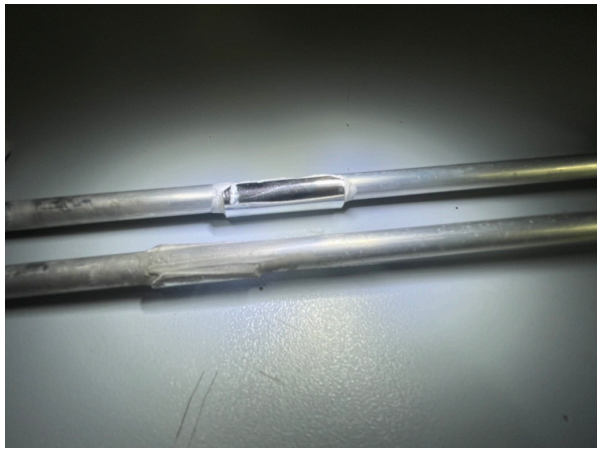


Problems solved and upgrades

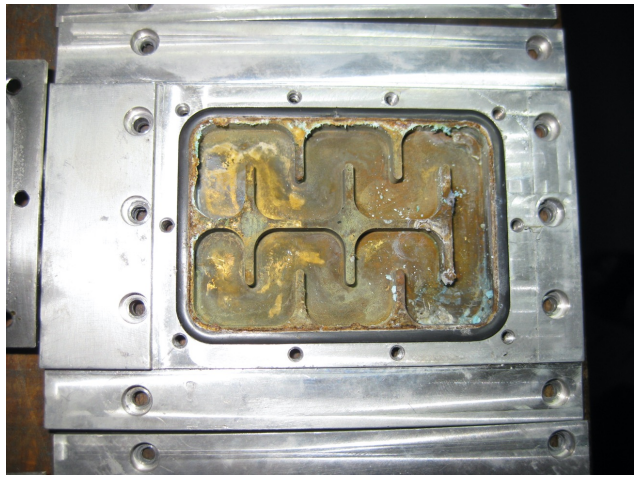
- LVPS: burning component (smell) in the new 6/12 V LVPS crate (ch. 4). The smell disappeared after ON/OFF cycle. All channels are working as expected
- LVPS PLC/GUI: Unexpected general 6/12 V LV OFF. Lost GUI control. Recovered control switching to manual mode.
- LVPS: the PROFIBUS module of the new 6/12V PS is not working. Diagnosis @ Saclay: hardware failure due to design problems. Problem fixed by AXIS and module sent to LNL. Preventive maintenance of 48V PB module. Fixed and installed at LNL in September. Now ok. Lengthy test procedure: purchased test LVPS unit purchased by GANIL
- LVPS GUI: wrong display of LV status (green lamps OFF when LV ON). Fixed in the updated software version
- LVPS PLC/GUI: inconsistent current reading for the 6/12 V and 48 V units. Problem fixed in the new LVPS (calibrated)
- LVPS 6/12 V cables: unstable baseline observed in 2 capsules. Problem fixed using different preamplifier (6/12 V) cables
- EPICS manager: IOC disk failure. PC replaced with spare by Saclay colleagues
- LN2 GUI modified: changed position of the detector select/unselect buttons to avoid accidental clicks and unwanted HV shutdown (occurred twice)
- LN2 GUI: CS-studio - EPICS parameters out of sync. Problem fixed re-flushing updated software (GitLab maintained by Saclay)

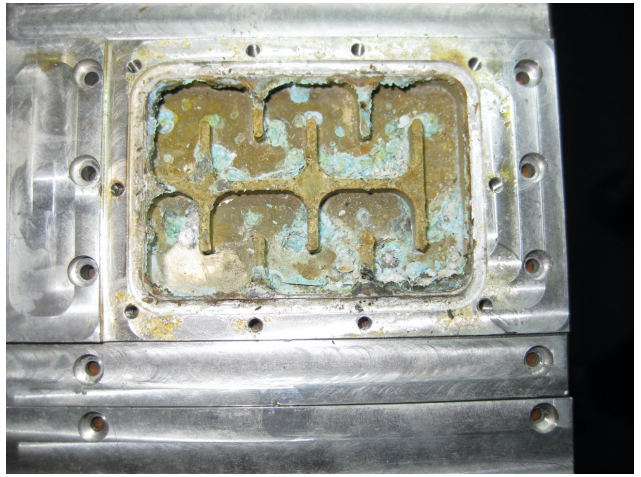
What's ado about LNL cooling water ?





Holes observed in several V1 digitizer's cooling plates and pipes

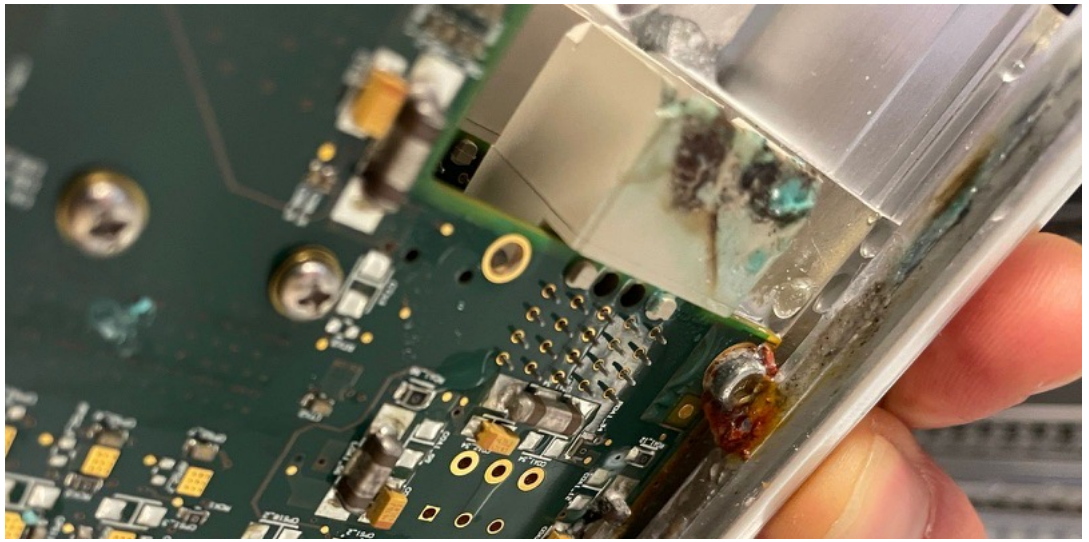


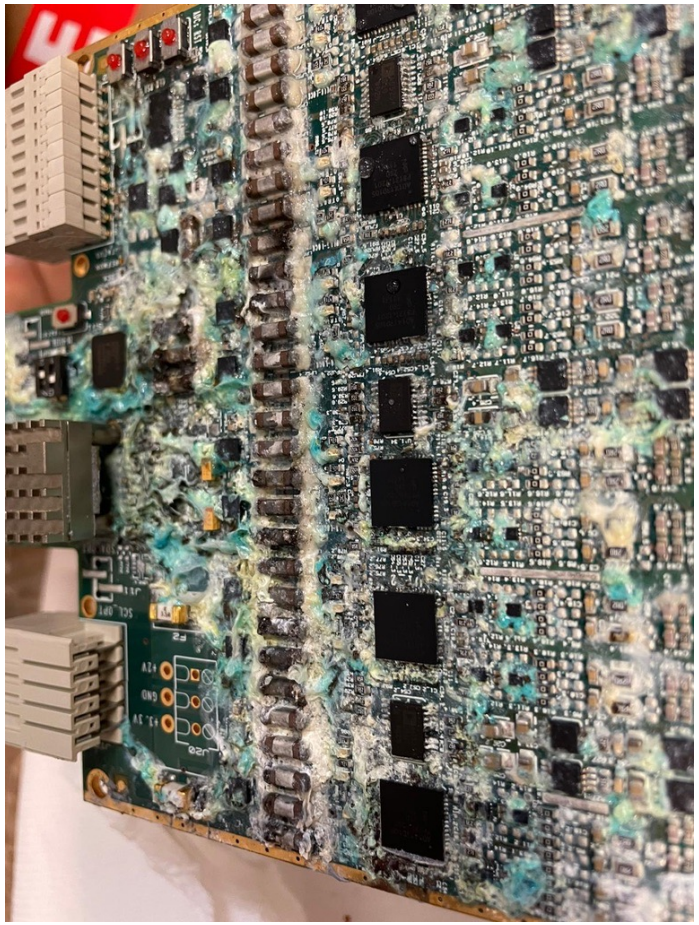


Corrosion (intermediate to severe) along the water path

Deadly effects on the electronics

Damaged digitizers from corrosion of Al plates and pipes





Work in progress: *modify the cooling system to add a chiller/heat exchanger using "non corrosive" cooling fluid*

Thank you and have a nice day!

+ Marco, Fabio, Loris, Matteo, Nicola, Mirco, Paolo, Daniele and many others

by Maria Markova (Oslo University)