100mm Assembly

BULLKID-DM Collaboration Meeting

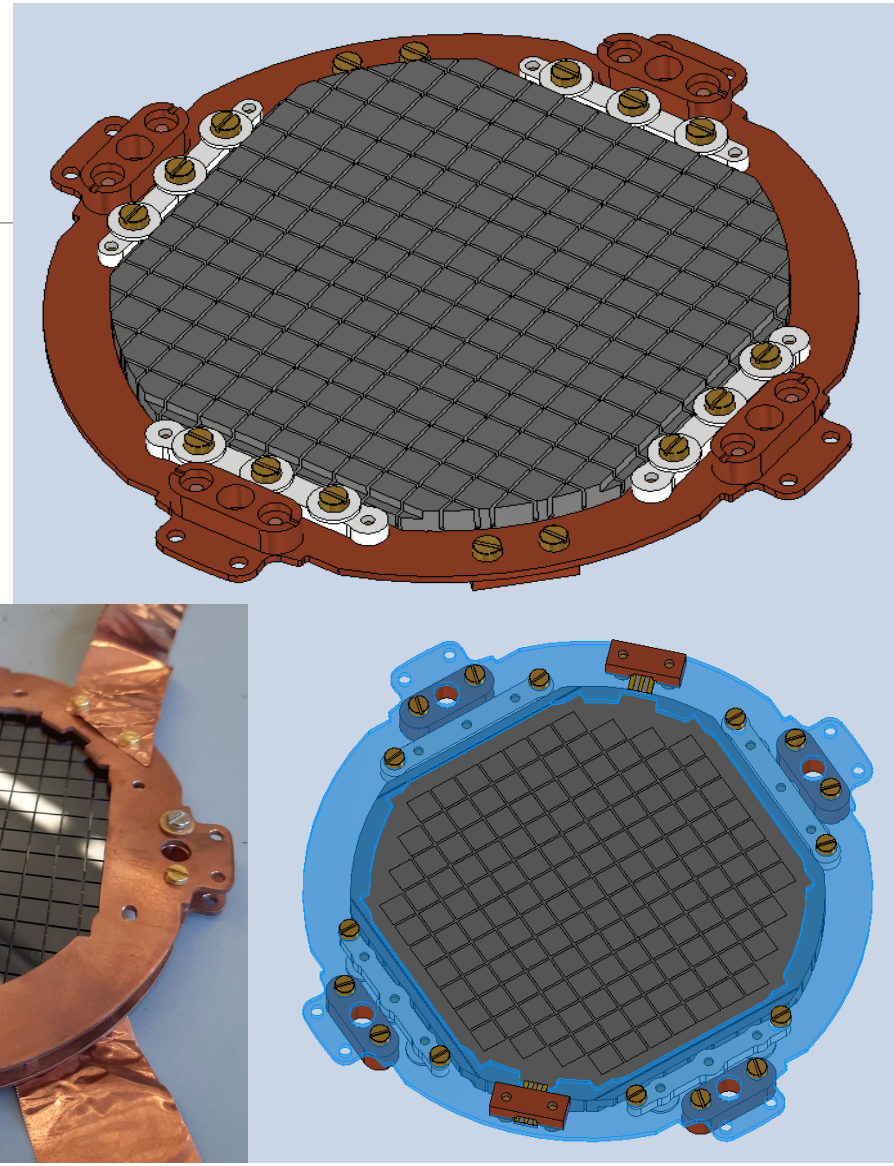
02/07/25

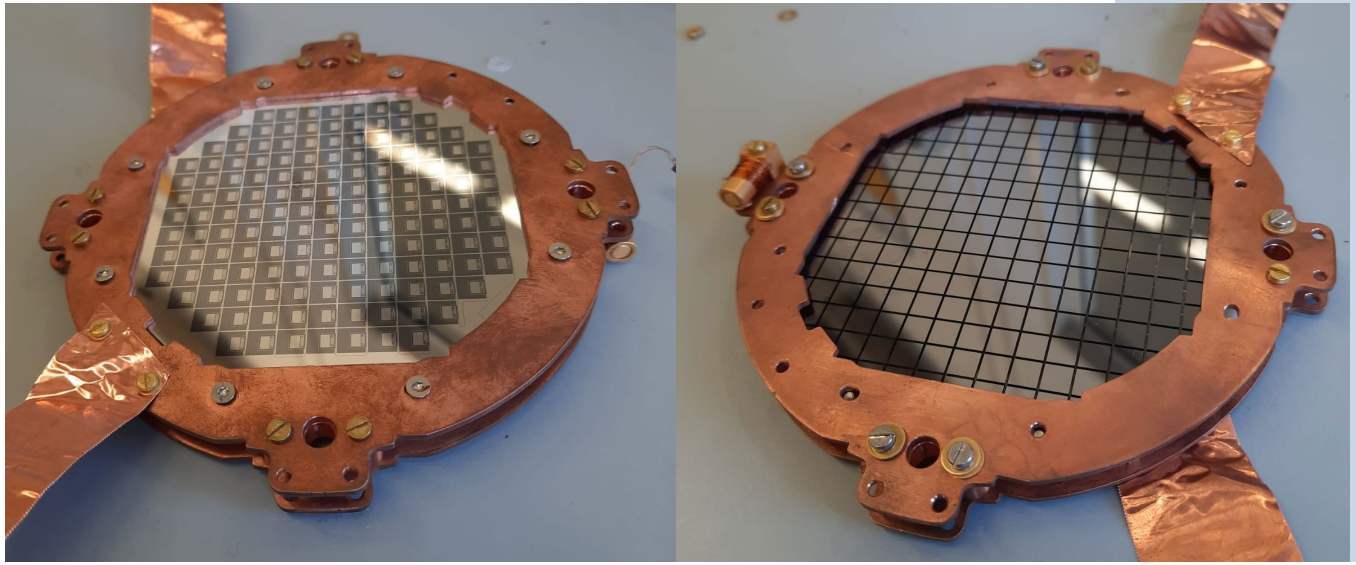
DANIELE PASCIUTO on behalf of the group

The prototype

Main characteristics:

- Minimize materials with impurities (e.g. Cu)
- Optimize thermal contact between the holder and the silicon
- Referable and reproducible stackable structure (16 units ok!)
- Optimizing cost and machinability in INFN structures





3 UNITS

Single module prototype

Constraints:

- Vacuum 10-8 mbar
- Temperature 20mK
- Low radioactive background
- Good mechanical and vibrational stability
- Easiness of mounting and handling

Materials allowed:

- Copper OFHC
- PTFE

Partially done
Fasteners

Done
PTFE tab

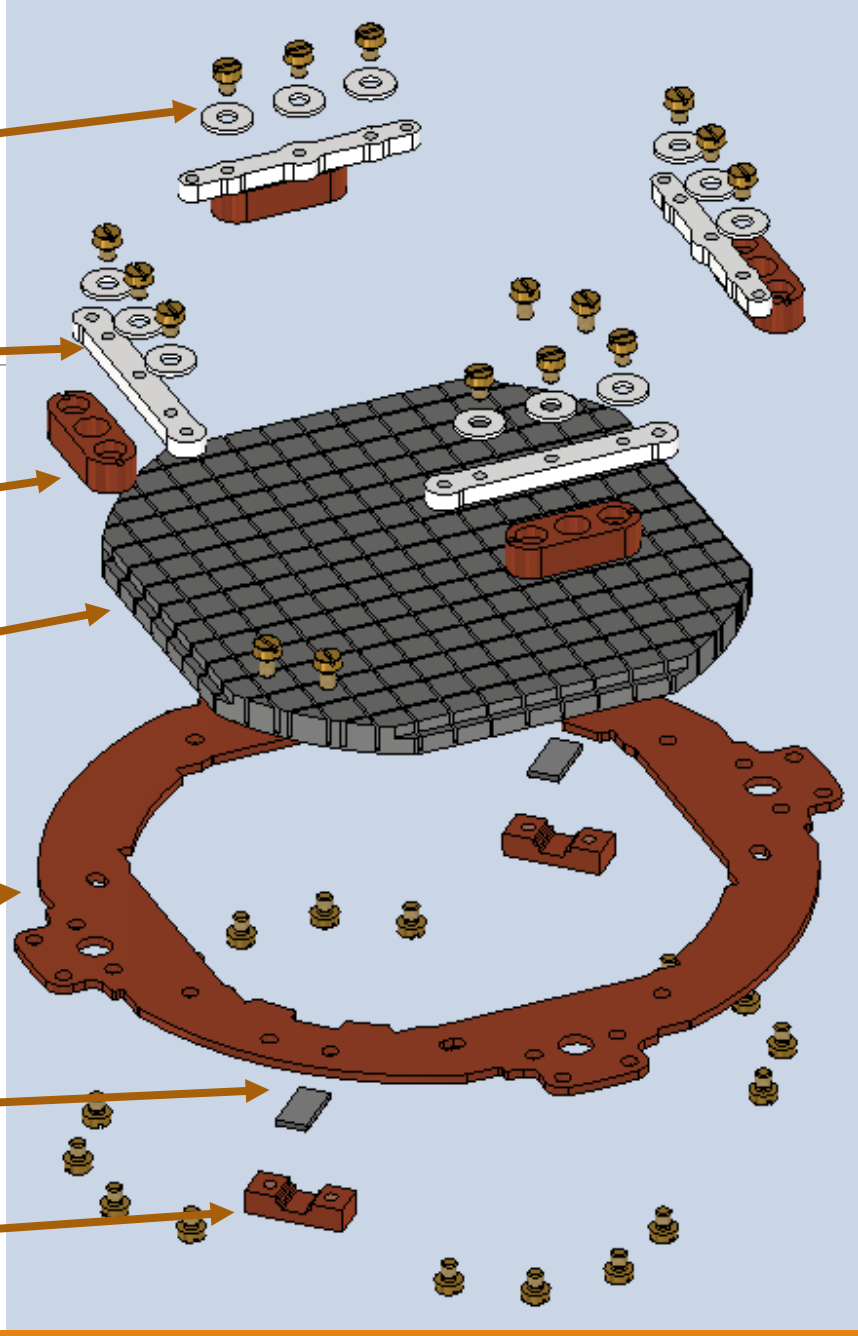
Done
Spacer

In Progress
Wafer

Thermal distribution Layer
Done

In Progress
Launcher

Launcher holder
Done*



3-Module stack

Pure aluminum (1000 series) vessel for shielding ?

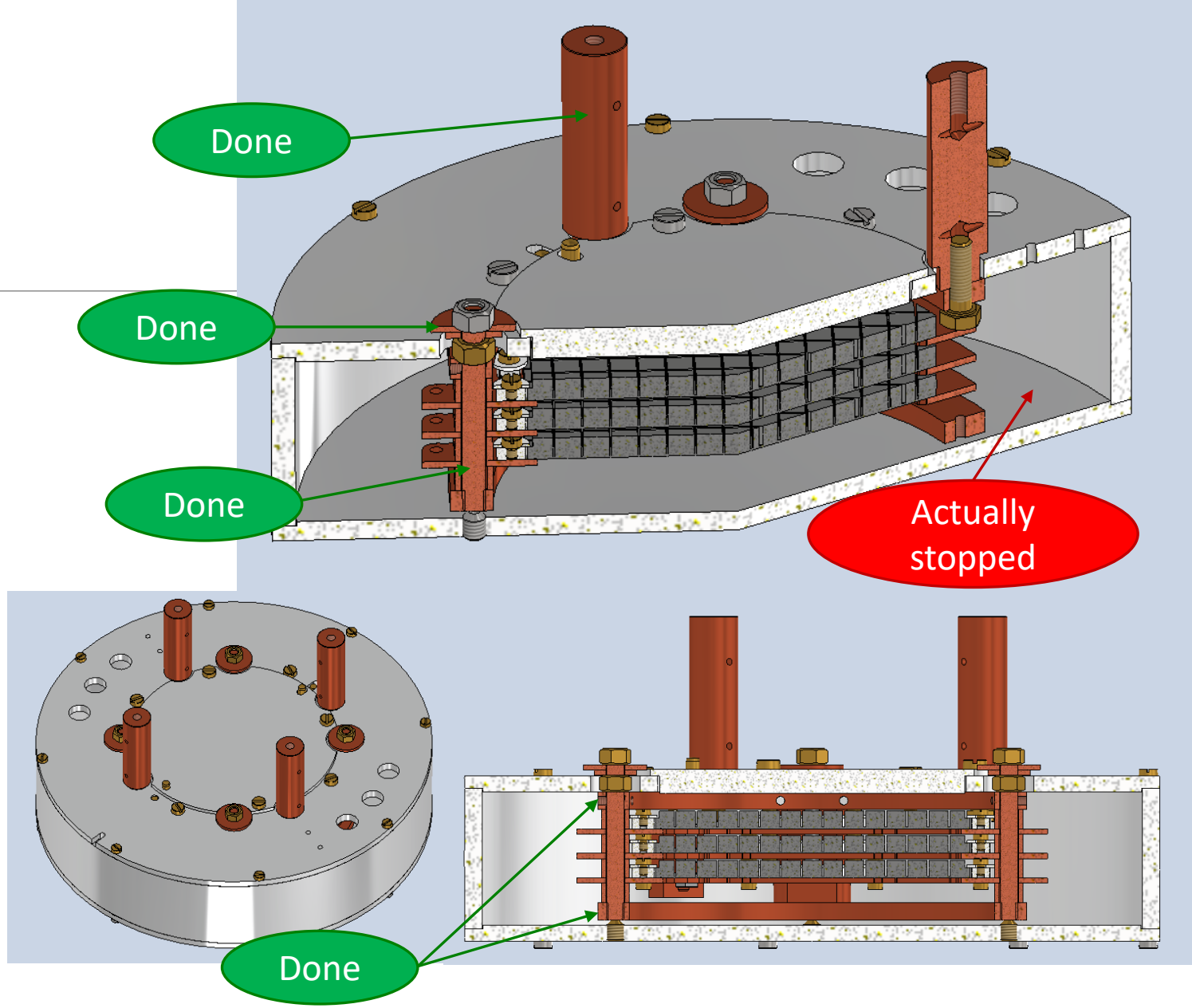
Upper and Lower copper rings
- Stiffer structure for vibrations
- Thermal distributors for cooling

Copper rods for thermal contact with cold plated

Feedthroughs for fibers in the aluminum lid for optical calibration (just a dummy plate in the drawing)

To do: Preliminary design ok, but need to be finalized (technical drawings and final quotes);

Procure material



3-Module assembling

Using an aluminum platform, tight the lower stiffening ring, with the spacers and the columns.

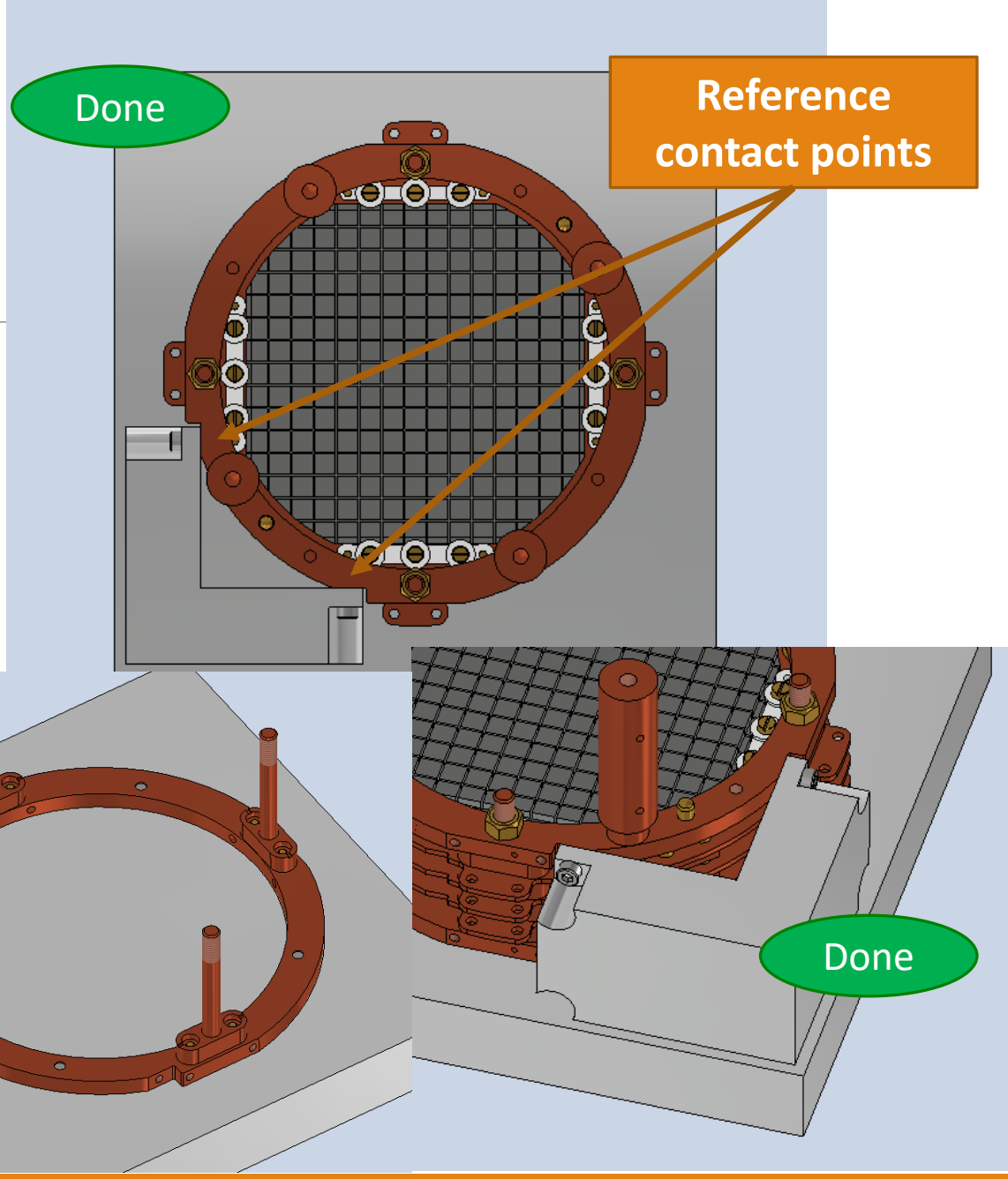
Piling up all the required detector layers (3)

Place the upper stiffening ring with the pillars (for future connecting at the cryostat)

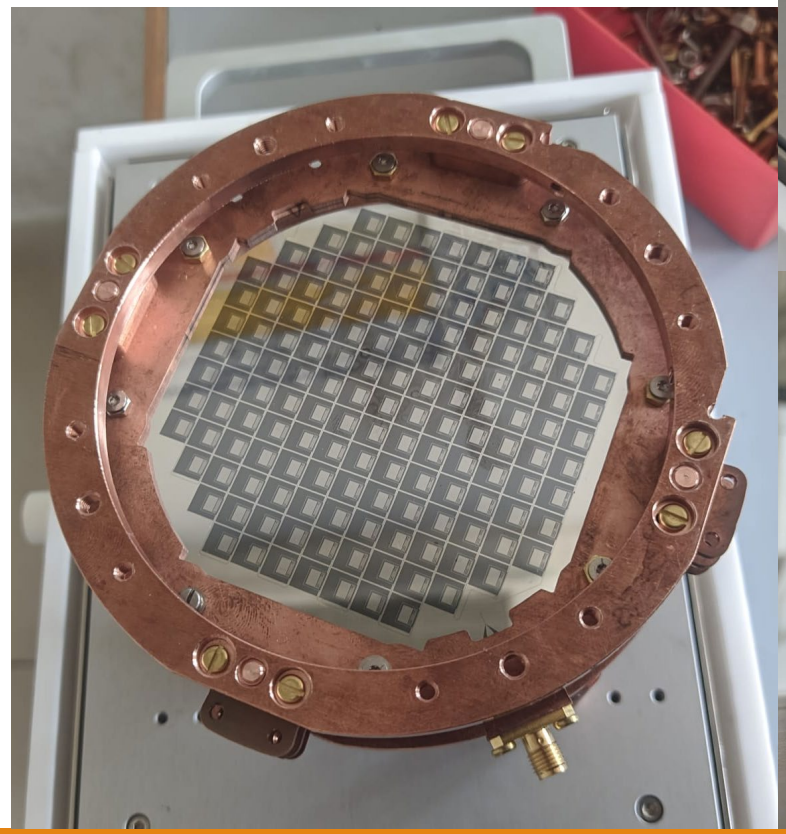
Use a reference square to tight all the layer in referenced position

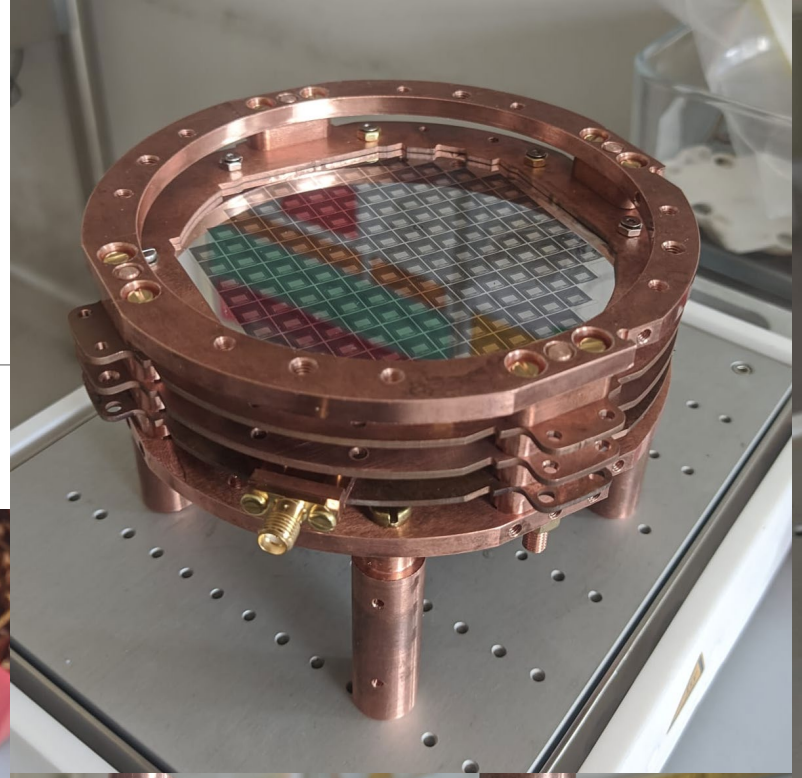
Untight the detector from the basement and the reference square

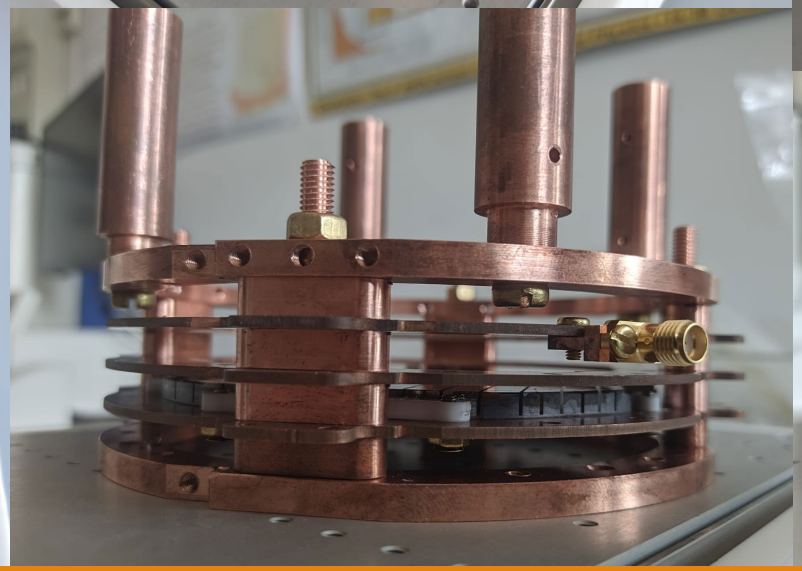
To Do: Realize a protection lid of the Silicon for mounting and handling

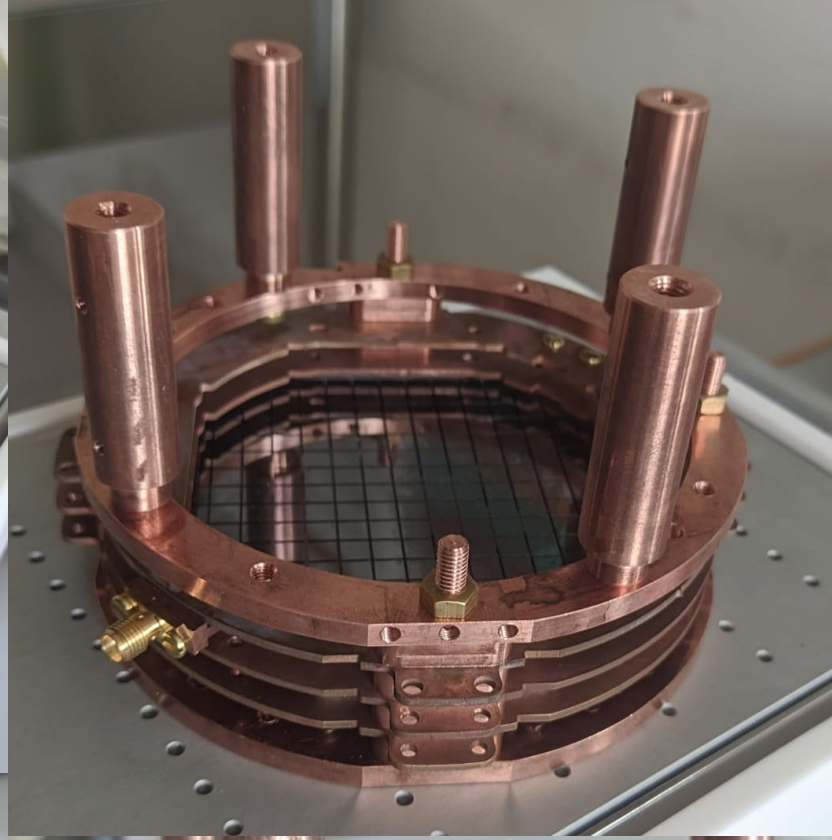


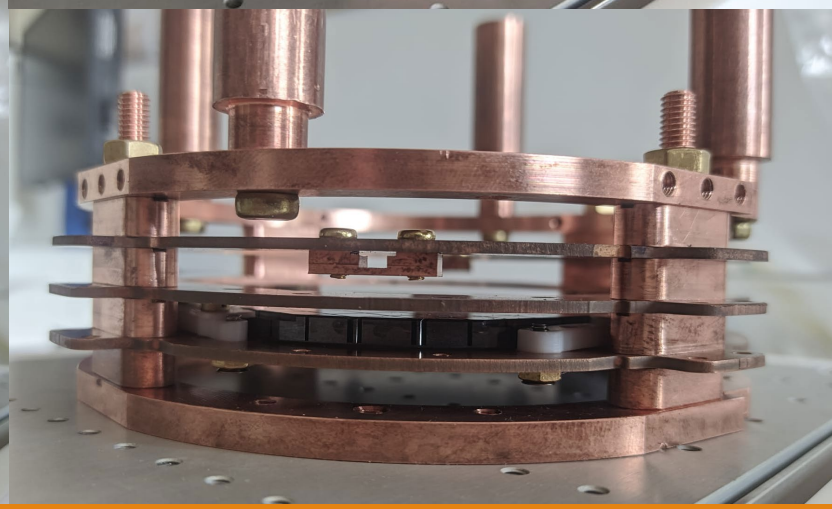
Some pictures











Launcher status

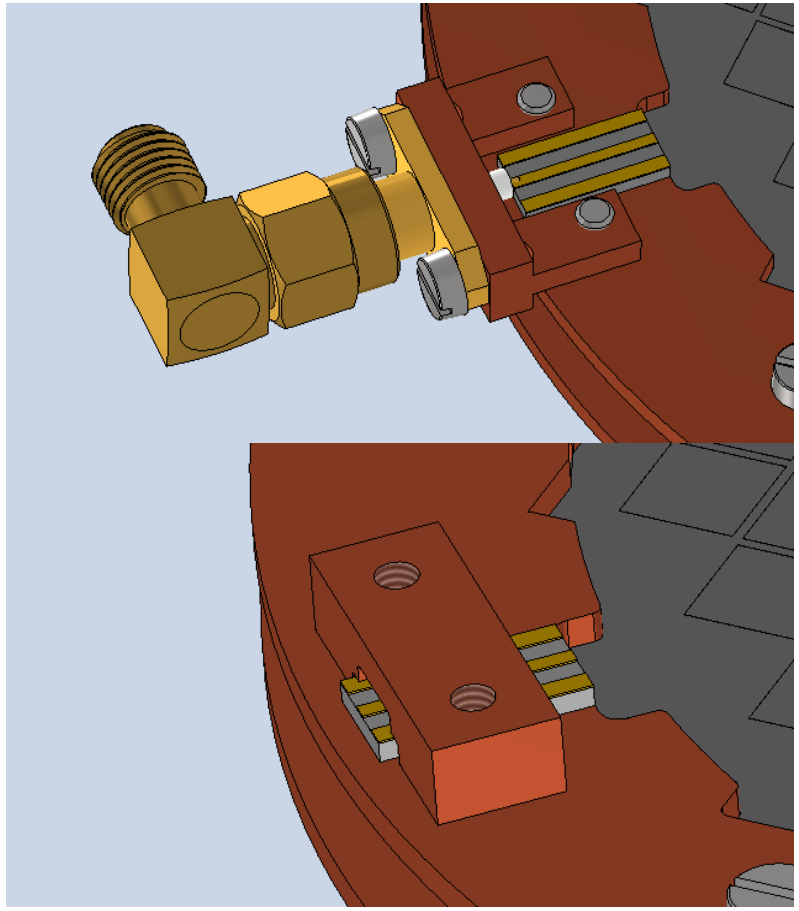
1. Temporary solution - Use of SMA connector
   - ✓ Suitable for mounting and dismounting
   - ✗ More components
   - ✗ Much more space required
   - Roger material

2. Upgraded solution **– soldered coaxial cable**
   - Silicium material 525um thick

2 test units ready for Silicium material

6 units ready for SMA connector

To Do: Cool down test and improve wiring fastening (if necessary)



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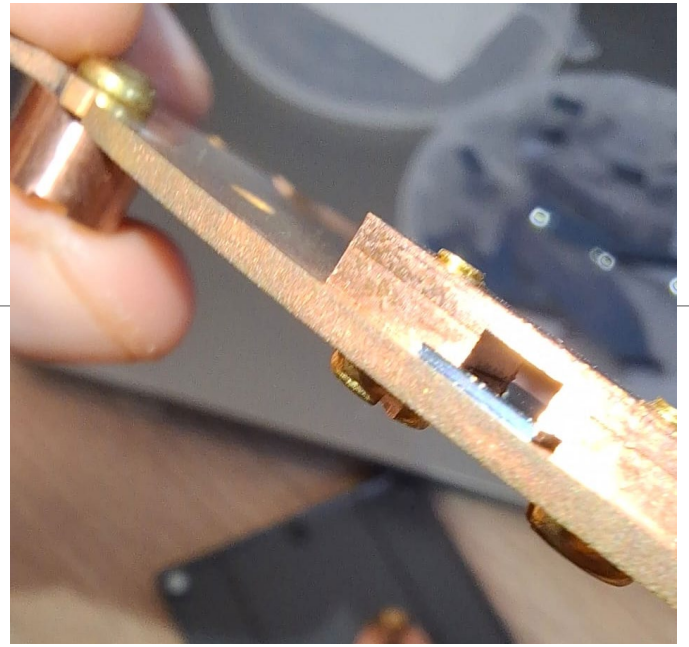
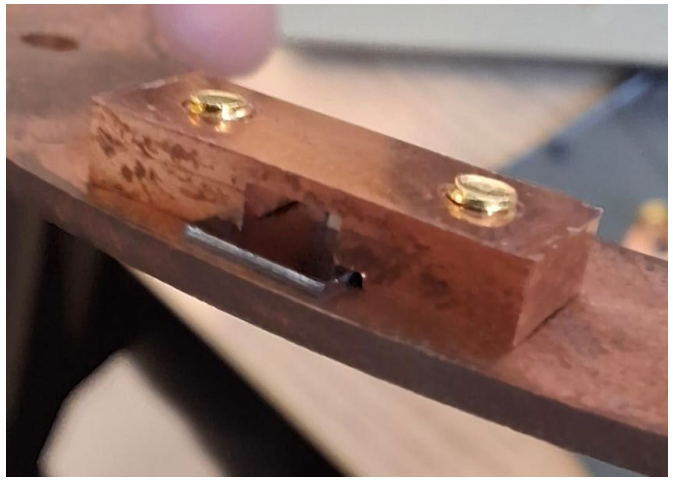
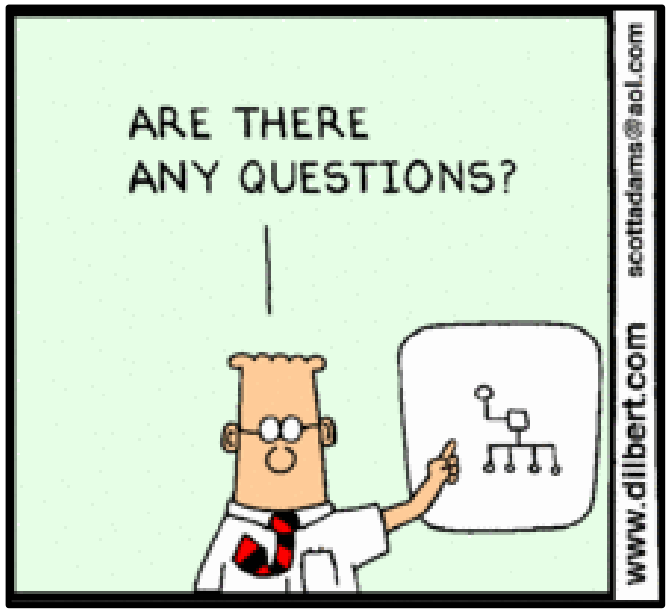




Thanks for your attention



Some pictures