100mm Assembly

BULLKID-DM Digest meeting

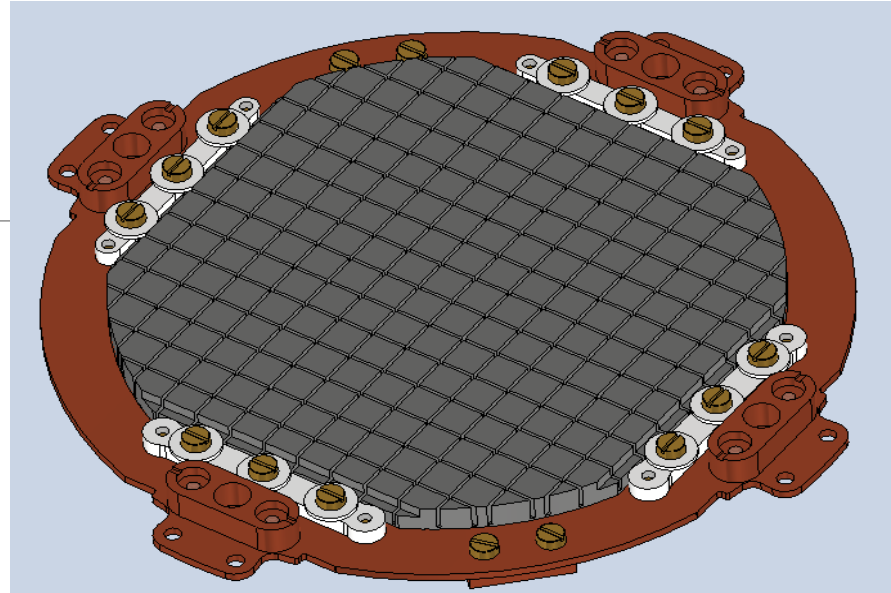
27/03/25

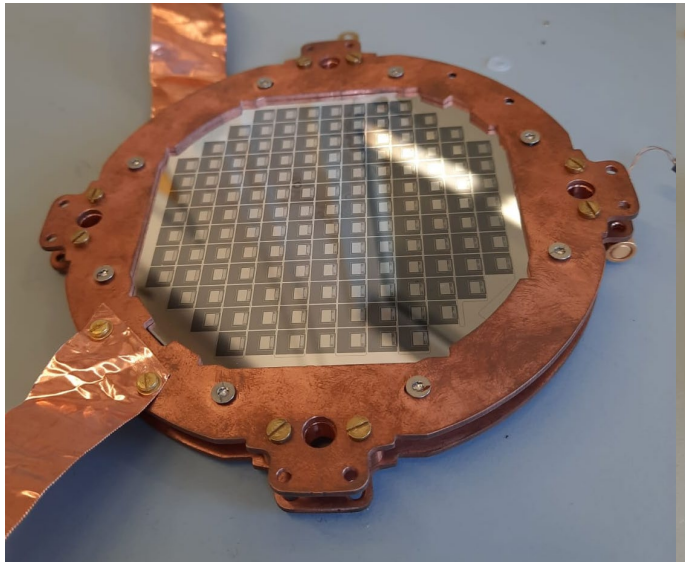
DANIELE PASCIUTO on behalf of the group

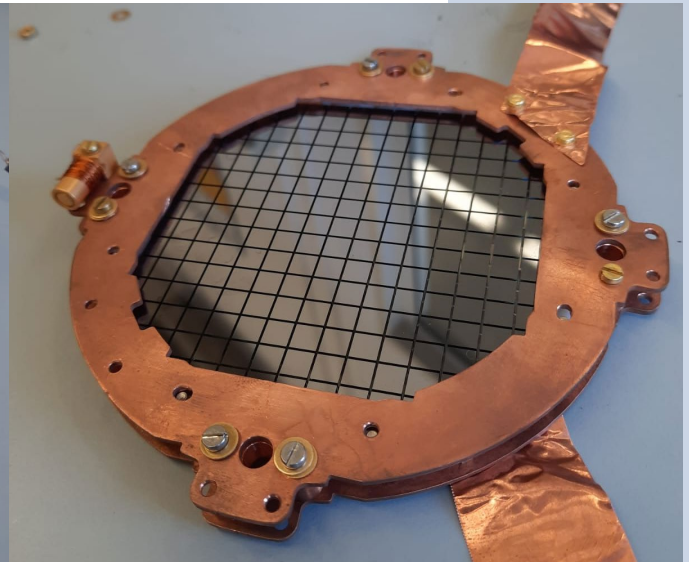
The prototype

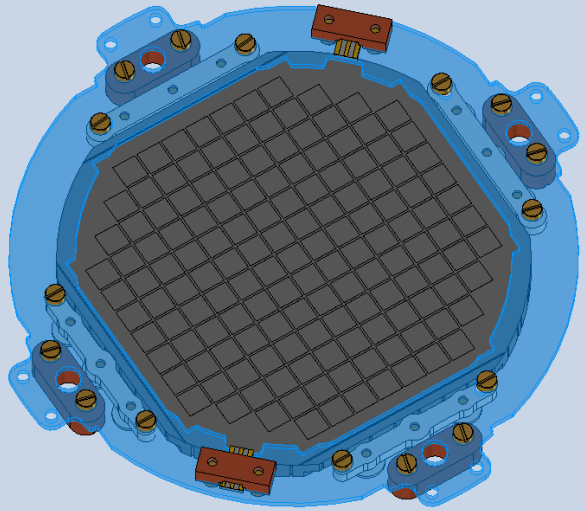
Main characteristics:

- 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



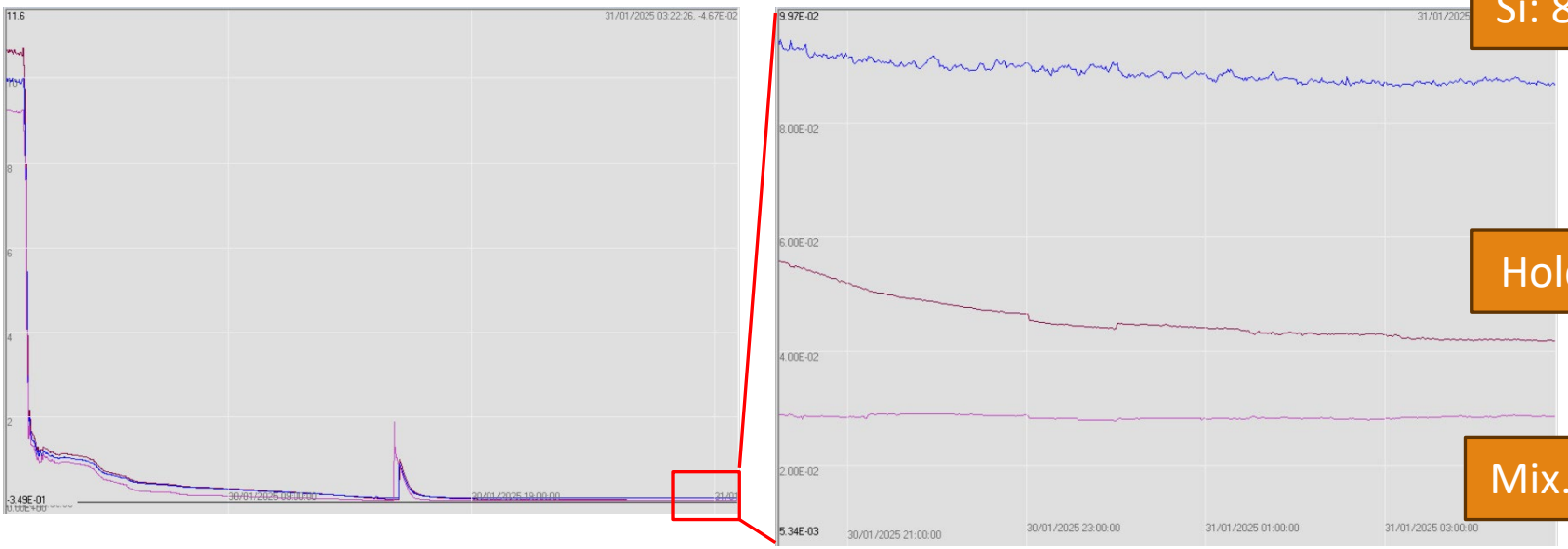


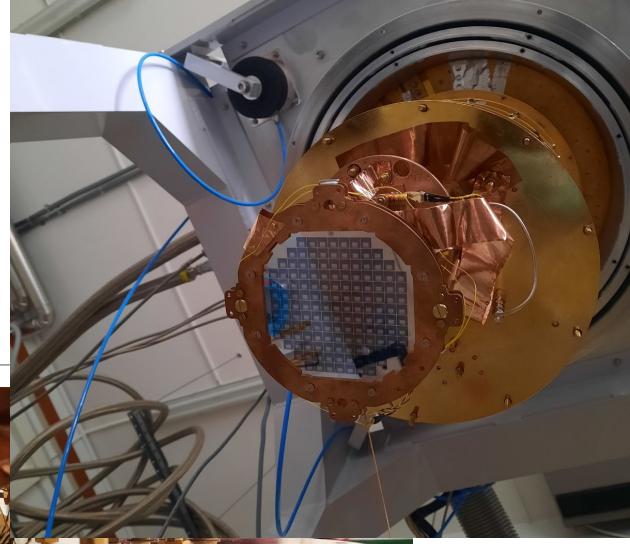


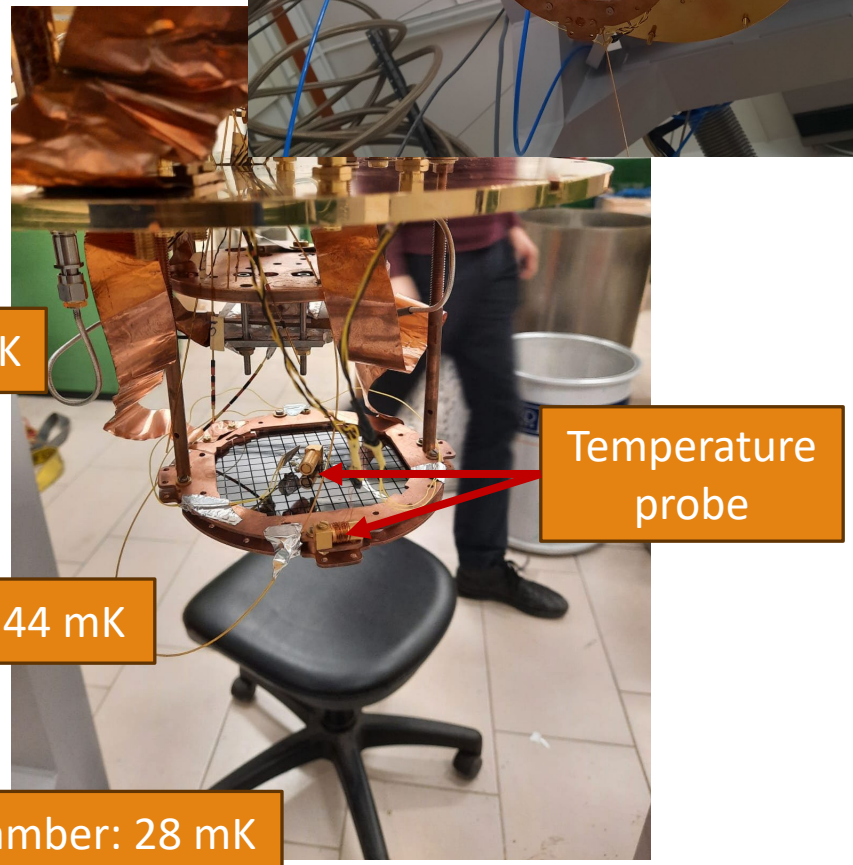


Thermal Test @INFN-Sapienza

- Two temperature sensors mounted (KID & Holder)
- The holder prototype has been cooled down up to 44mK
- Both holder and Si temperatures trend follow MC cooling
- No breaking occurred during cooling and heating







4 UNITS

Single module prototype

Constraints:

- Vacuum 10-8 mbar
- Temperature 0.02K
- Low radioactive background
- Good mechanical and vibrational stability
- Easiness of mounting and handling

Materials allowed:

- Copper OFHC
- PTFE

Done
Fasteners

Done
PTFE tab

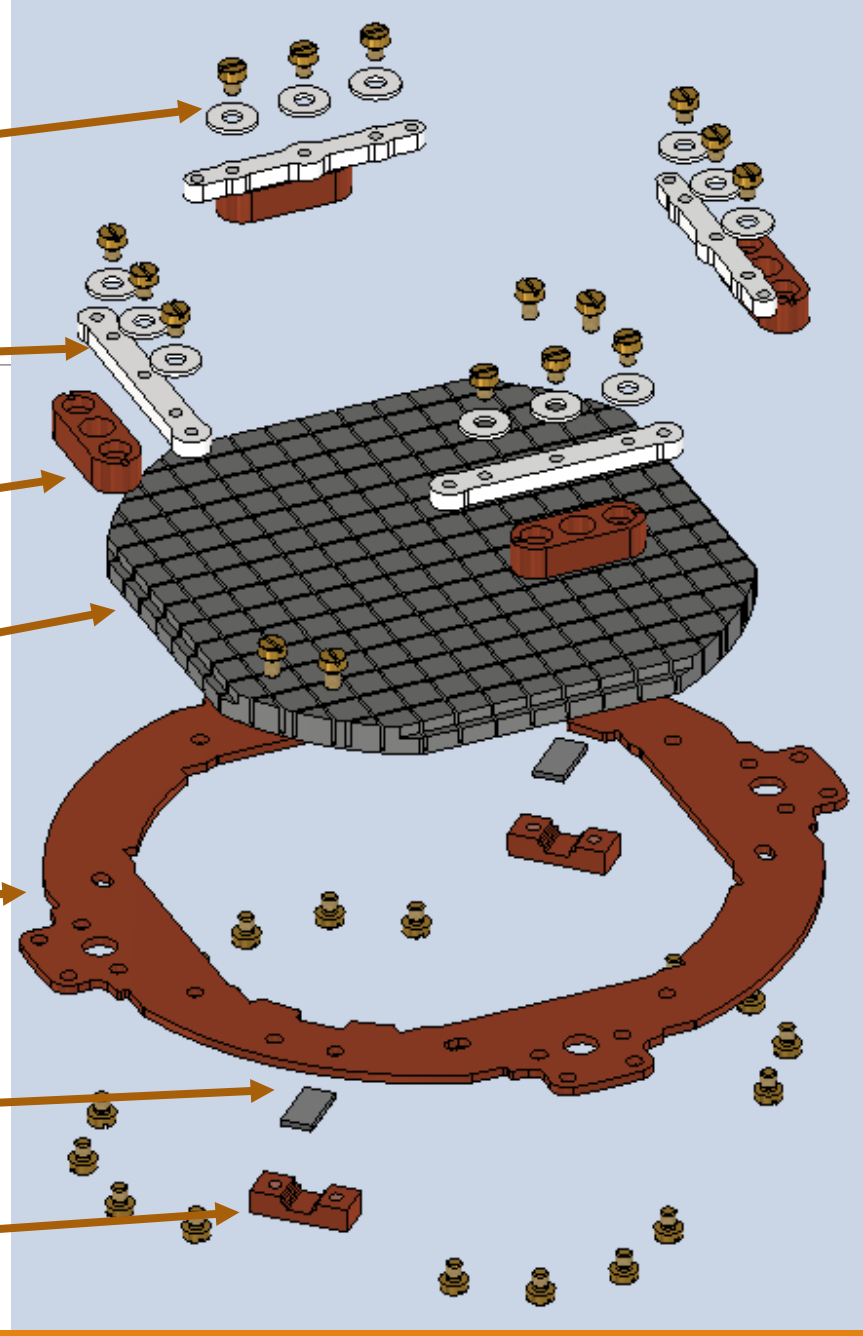
Mat. Ok
In process
Spacer

Wafer

Thermal distribution Layer
Mat. Ok
In process

Launcher

Mat. Ok
In process
Launcher holder

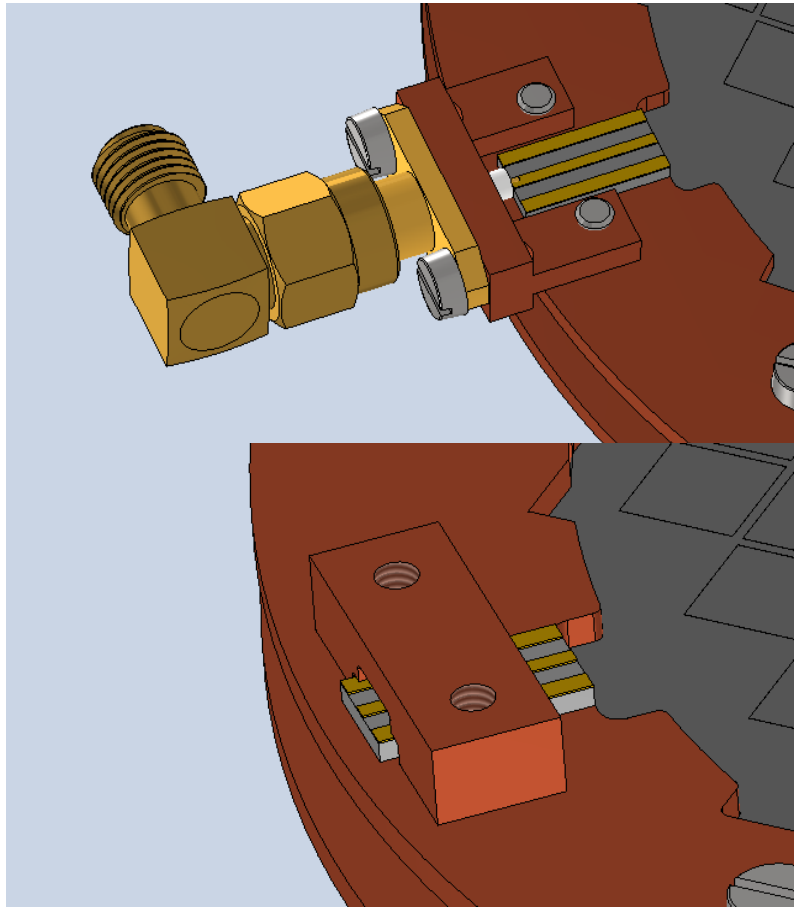


Launcher status

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

Both holders are in process of manufacturing



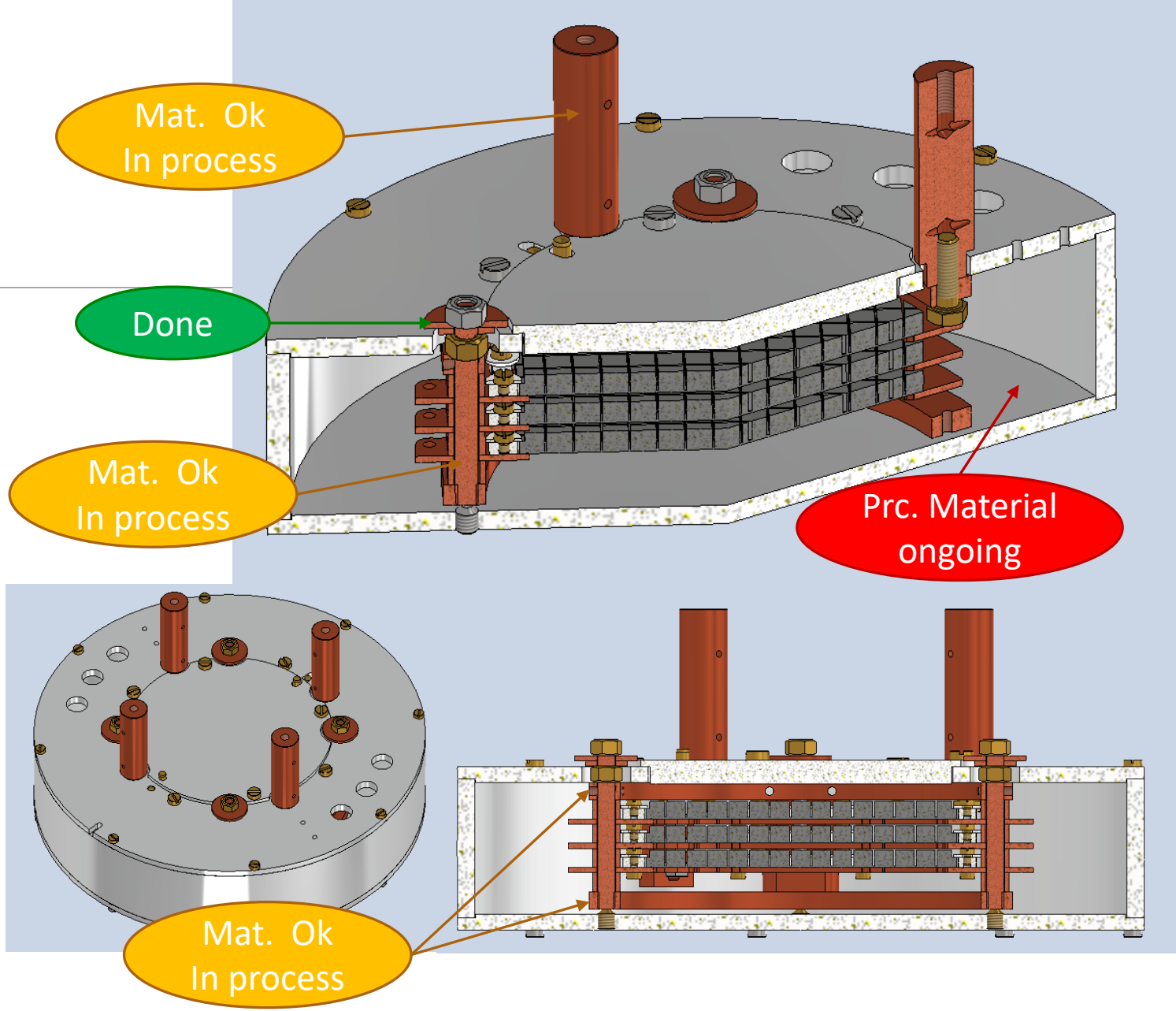
3-Module stack

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)



3-Module assembling

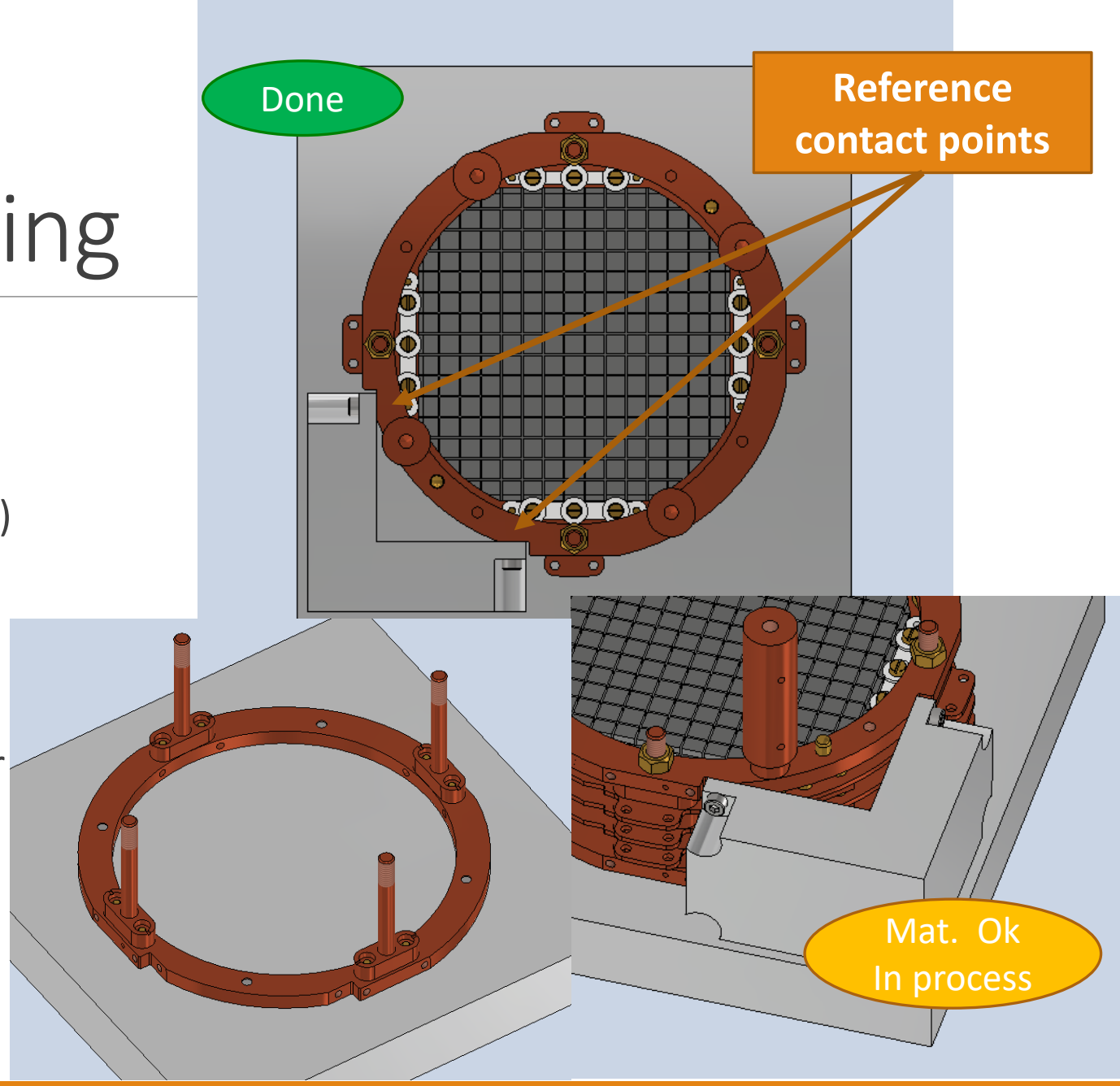
Using an aluminum platform, tight the lower stiffening ring, with the spacers and the columns.

Piling up all the required detector layers (3)

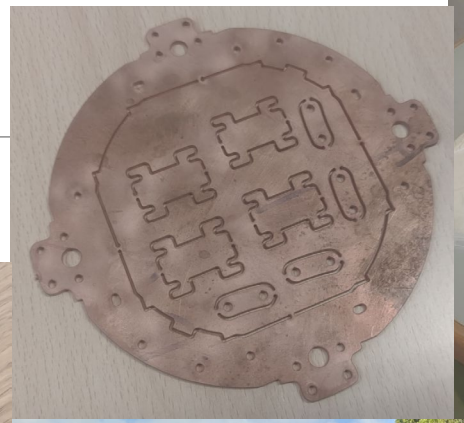
Place the upper stiffening ring with the pillars (for future connecting at the cryostat)

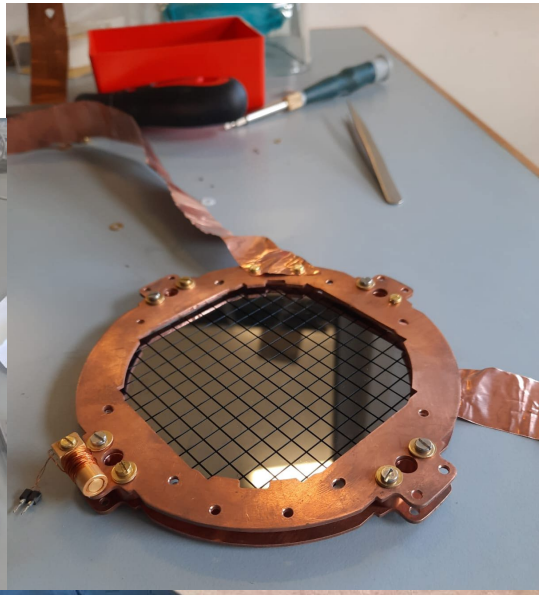
Use a reference square to tight all the layer in referenced position

Untight the detector from the basement and the reference square



Some pictures







Thanks for your attention