Introduction to the CRESST experiment

ISAPP 2024
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CRESST

Cryogenic **Rare Event Search**
with Superconducting Thermometers

MAX-PLANCK-INSTITUT
FÜR PHYSIK

The CRESST collaboration

MAX-PLANCK-INSTITUT FÜR PHYSIK

INFN LNGS
Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali del Gran Sasso

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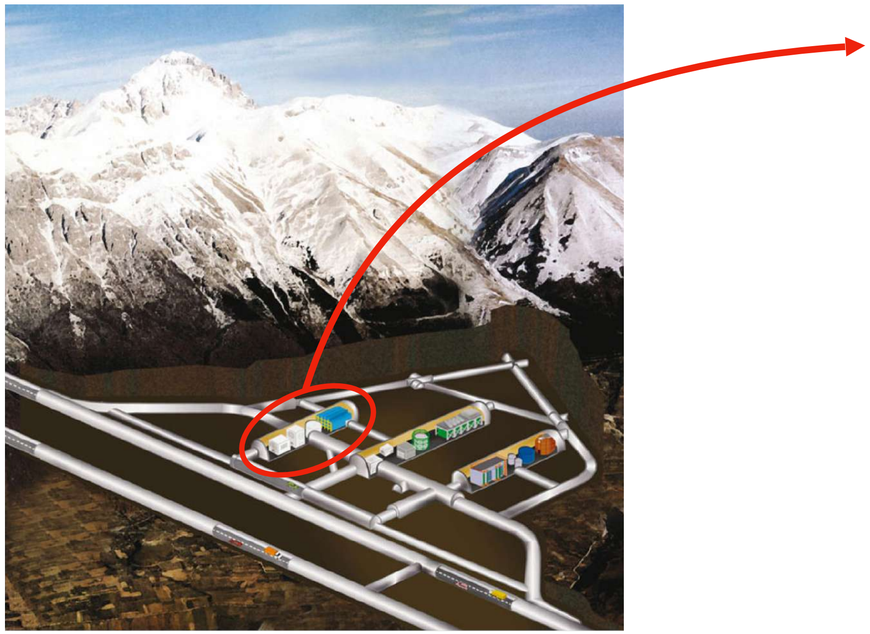
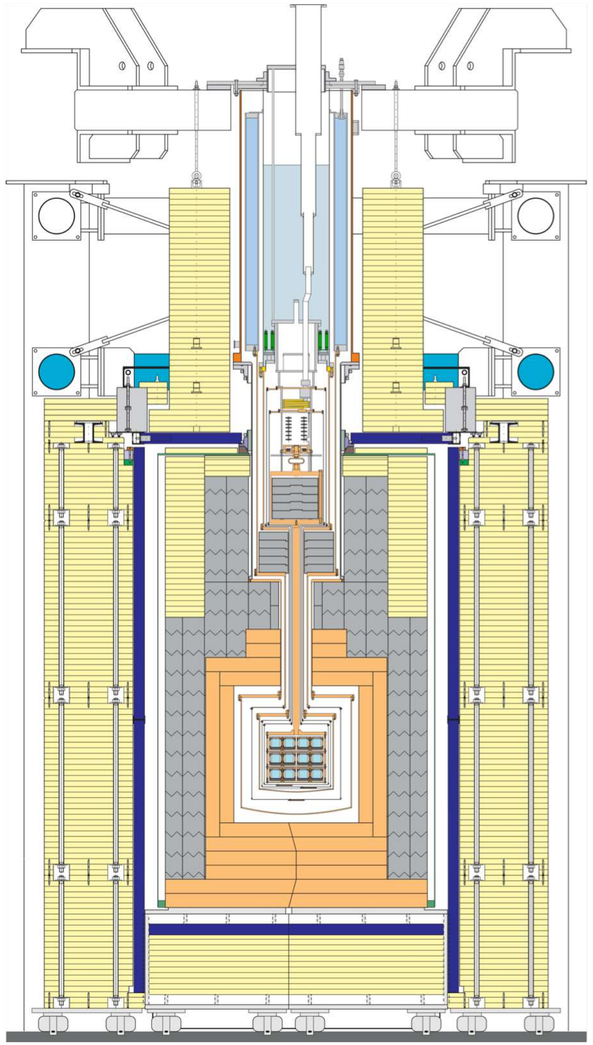
HEPHY INSTITUTE OF HIGH ENERGY PHYSICS

UNIVERSITY OF OXFORD

The CRESST experiment

- Cryogenic Rare Event Search with Superconducting Thermometers
- CRESST aims to directly detect dark matter particles by studying their scattering off target nuclei using cryogenic detectors
- Situated at Laboratori Nazionali del Gran Sasso



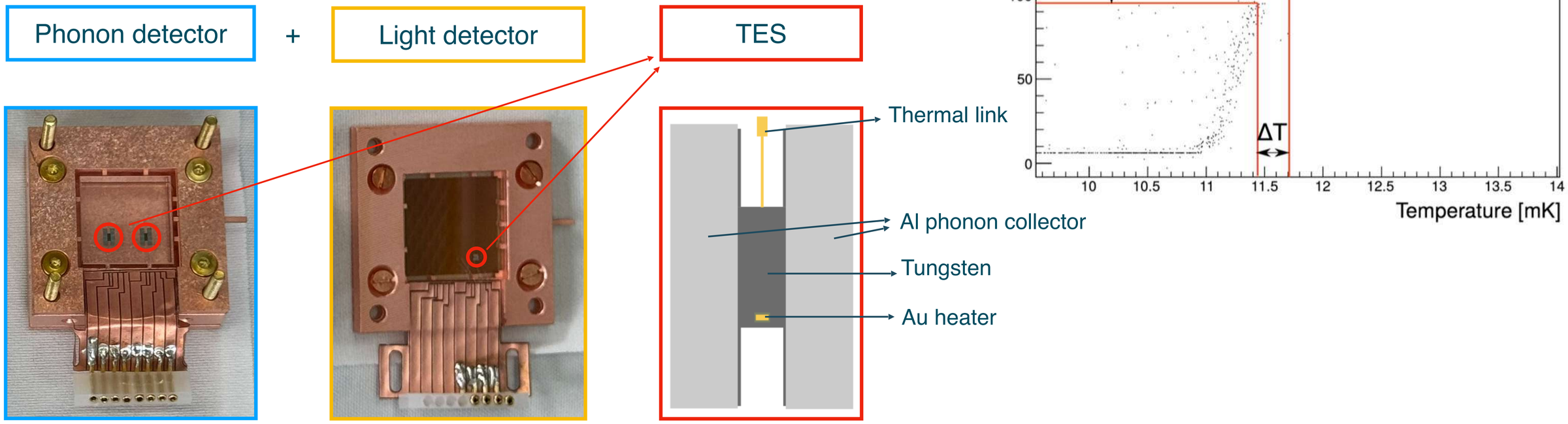


CRESST measurement principle

- Particle interaction in the target crystal:

$\Delta E \sim$ keV $\longrightarrow$ $\Delta T \sim \mu$K $\longrightarrow$ $\Delta R \sim$ mΩ

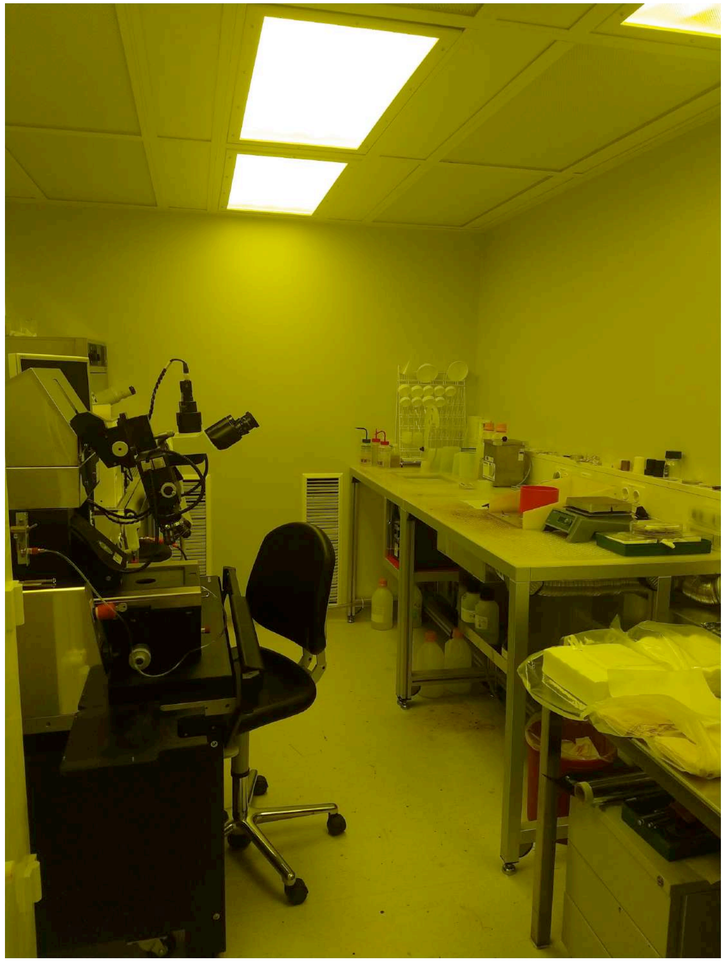
- Transition Edge Sensors




The Labs

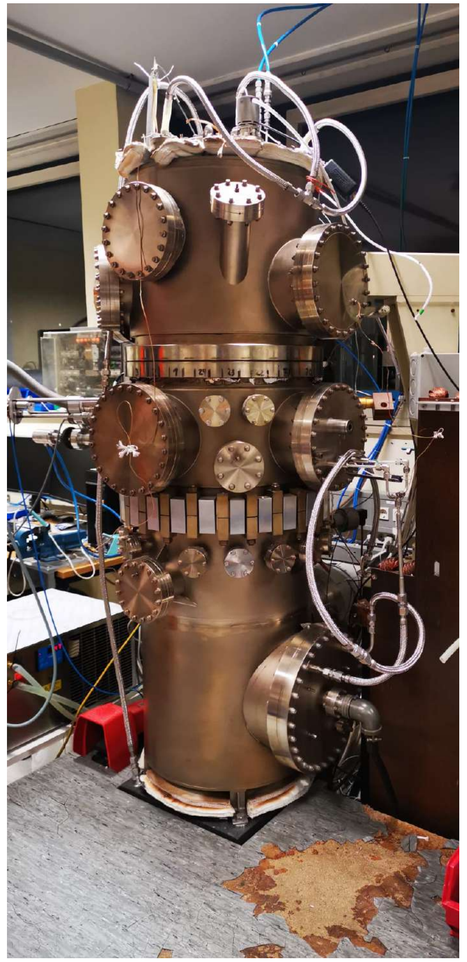
The Max Planck Facility

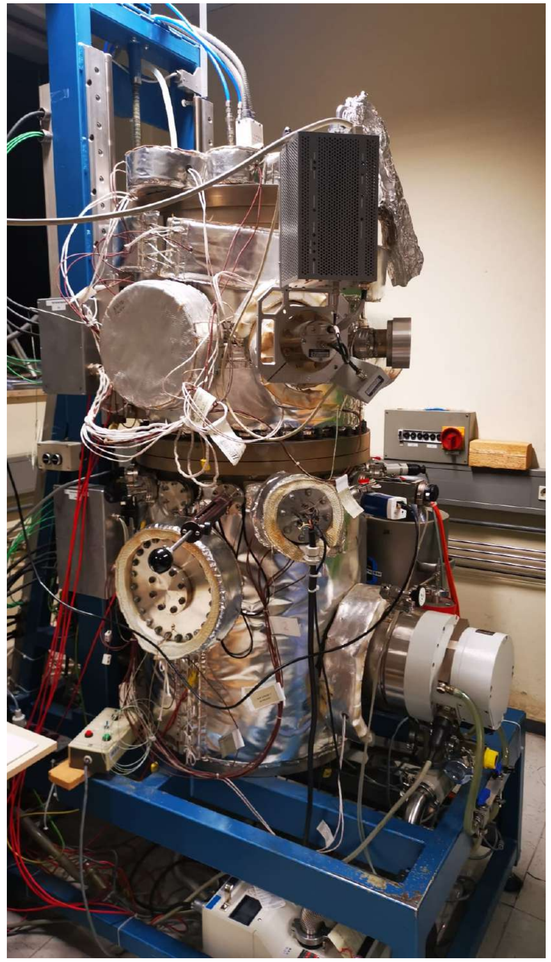
Cleanroom



Dress Code

Tungsten and aluminium evaporation machines

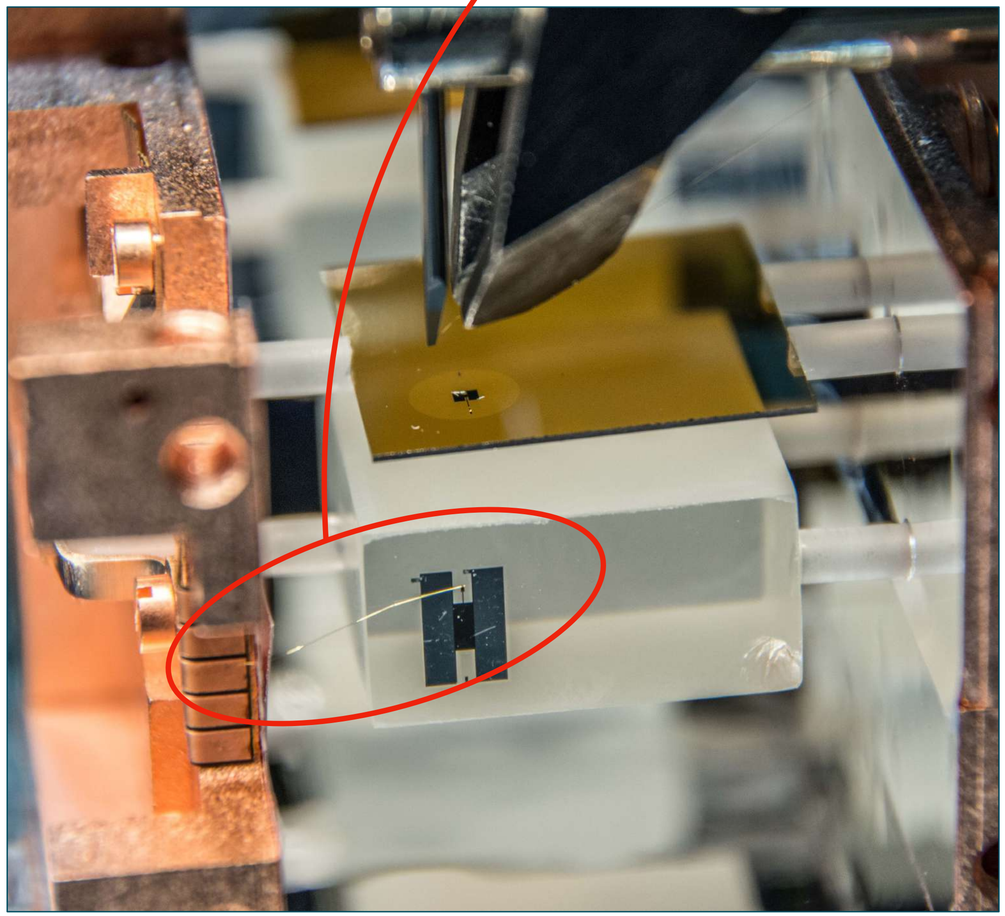




The Max Planck Facility

Bonding machines

Electrical connection



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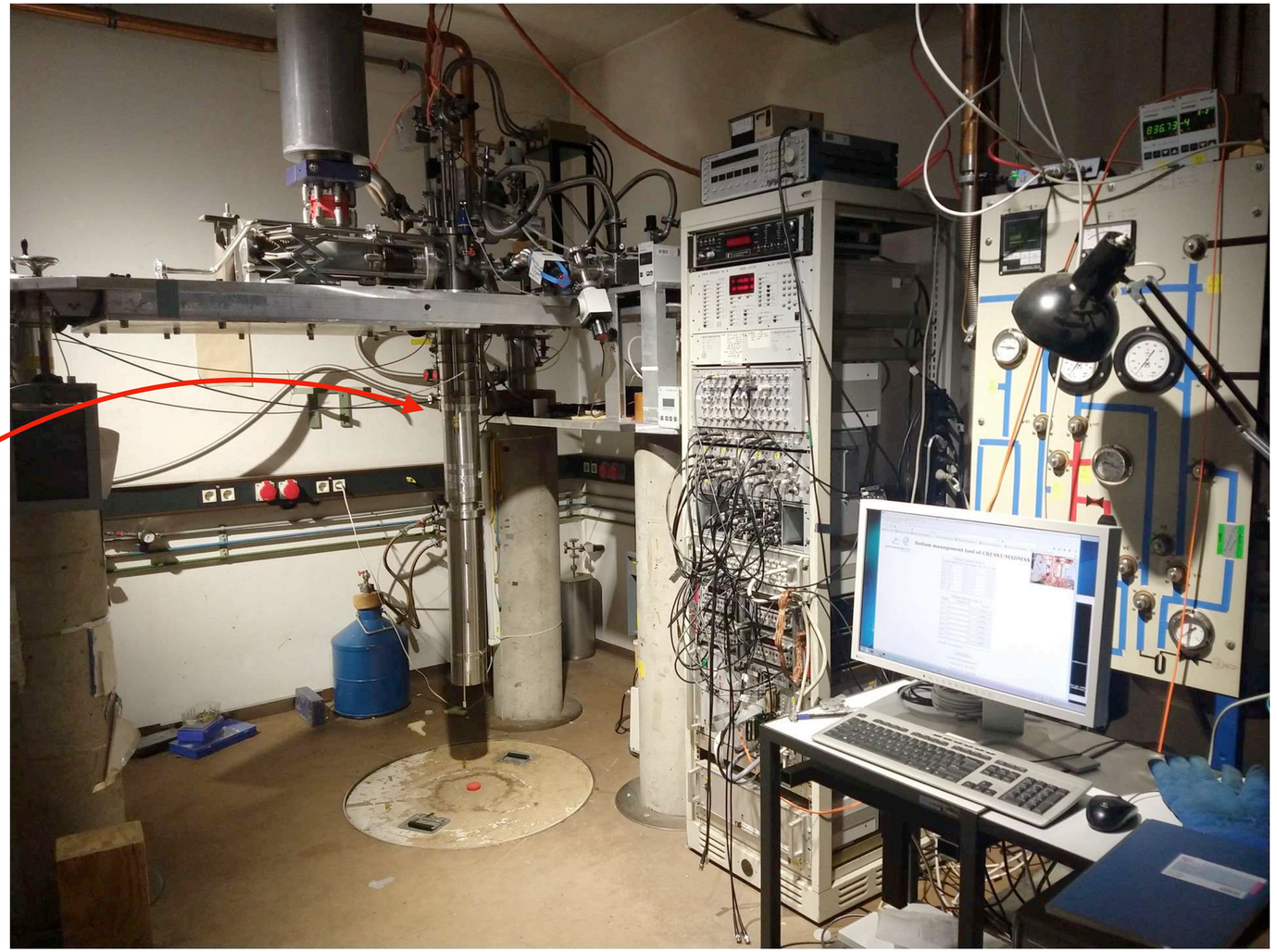
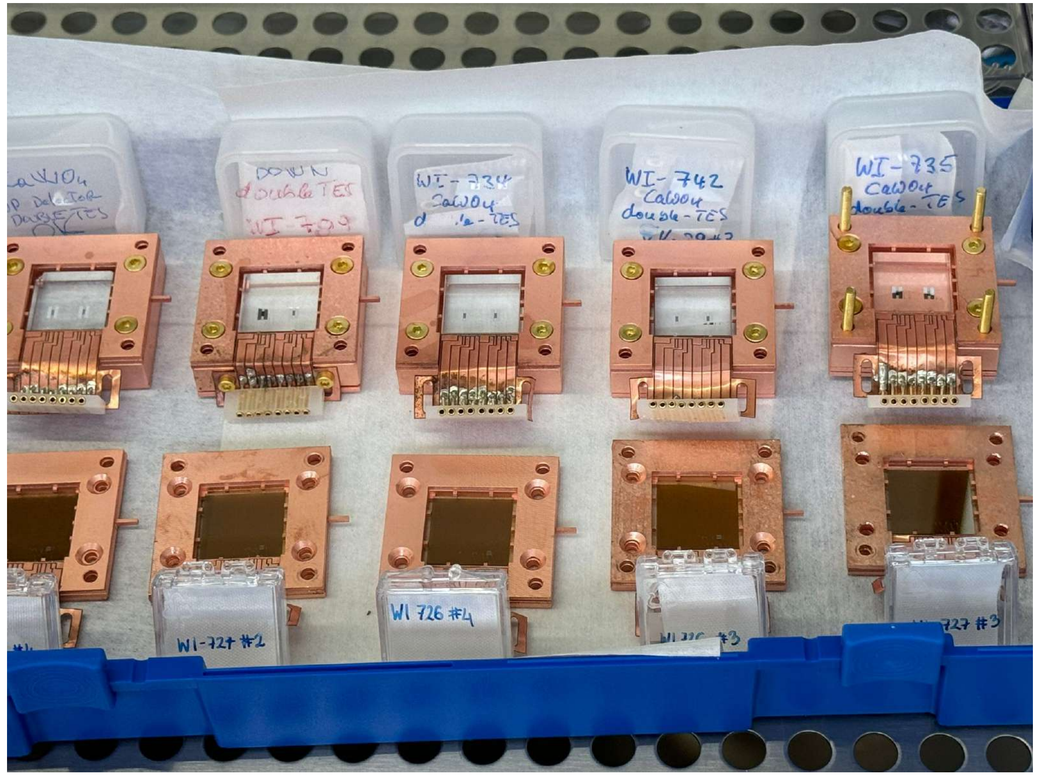
Cryostat



Preparation for the new Run



The mounting

The mounting: LNGS

Summary and outlook

CRESST facility

- CRESST detectors are produced and tested at Max Planck in Munich
- There are different laboratories for the different steps involved in the production and testing
- CRESST collaboration successfully started the new Run at Gran Sasso

Prospects

- New data acquisition: improve Dark Matter limit
- PhD project: R&D of low-threshold cryogenic detectors

Thank you!