

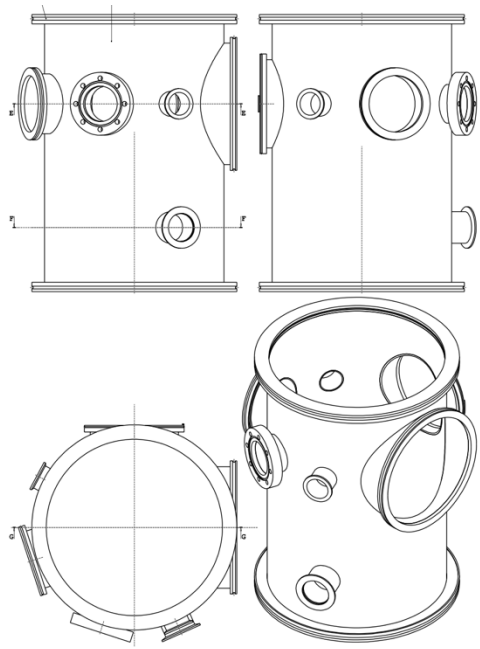
A photograph of a cryogenic facility. In the foreground, there is a large, cylindrical stainless steel chamber with various ports and a viewing window. To the left, a white cryostat labeled 'T-Station 300' by EDWARDS is connected to the chamber via a large, flexible, braided metal hose. The chamber is mounted on a grey metal frame. In the background, a wooden desk with papers and a red chair is visible. The overall scene is a laboratory setting for low-temperature experiments.

Cryogenic facility

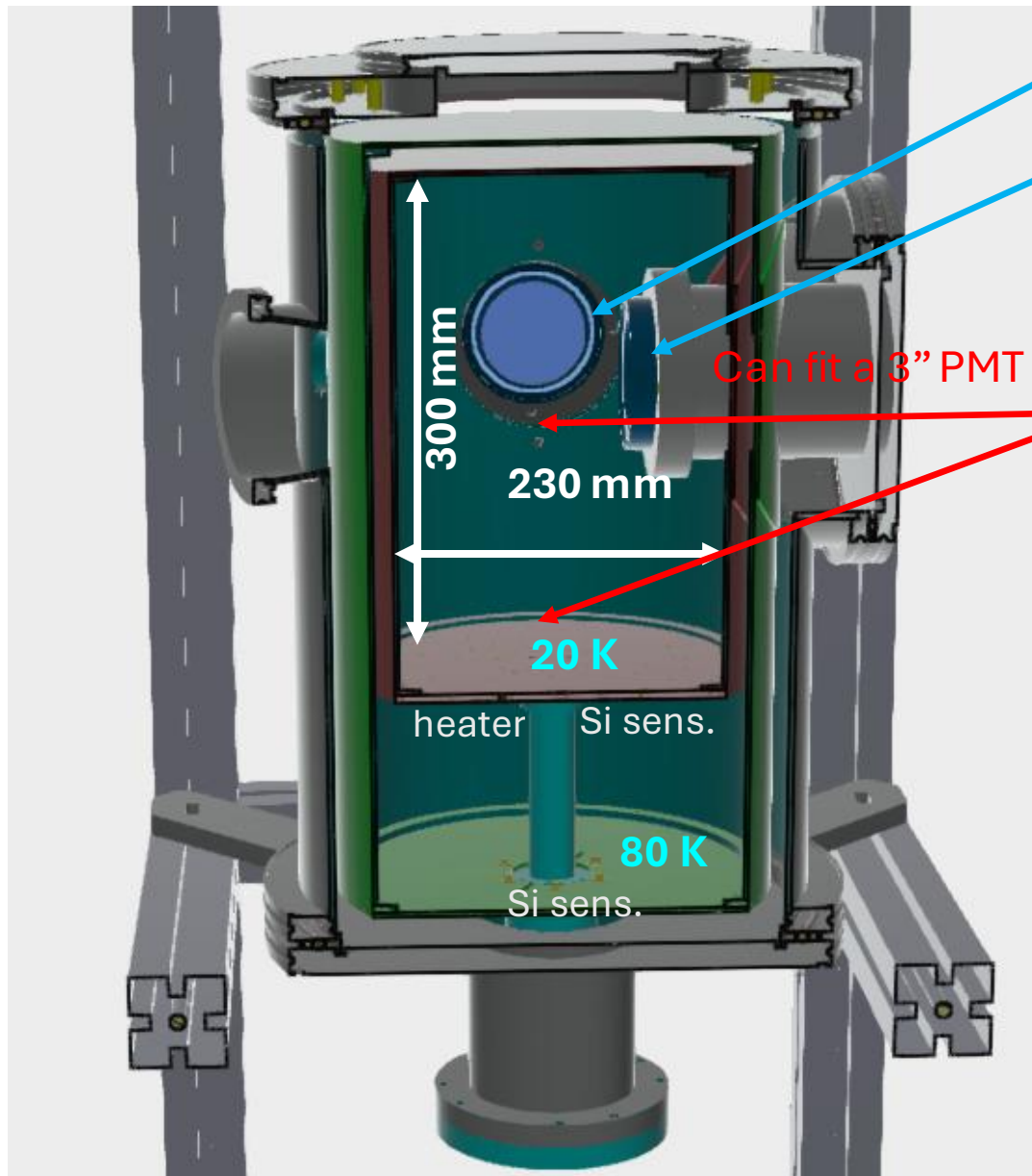
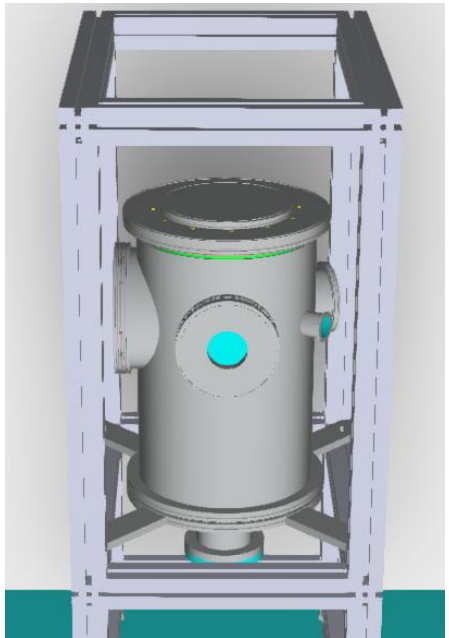
D. D'Angelo, A. Zani, V. Toso, E. Martinenghi,
F. Armani, A. Andreani e F. Cavaliere

What are we talking about?

- In 2023/24 we have acquired a **general purpose cryogenic facility**
 - Shared interest and financial effort of the *department* and *INFN*
- Installed in a laboratory **ed. LITA, 3rd floor**
- **Commissioned** (w/o load) in October 2024
- The sample is cooled *in a vacuum chamber* by contact with a cold finger
 - Closed loop He cryocooler
 - Two stage system: first stage at 80 K + second stage able to reach **15-20 K**
 - Cooling rate: 0.2-0.3 K/min with no load
- Inner vacuum chamber dimensions: 230 mm (d) x 300 mm (h)
 - Vacuum $10^{-7} \sim 10^{-8}$ mbar
- Sample holder to be designed, likely application specific



[all CAD drawings available]



70 mm optical window

70 mm re-entrant optical window

Can fit a 3" PMT

Your sample **holder** will go here

Currently: 25 pin
D sub feedthrough
T sensors +
heater +
7 pins free

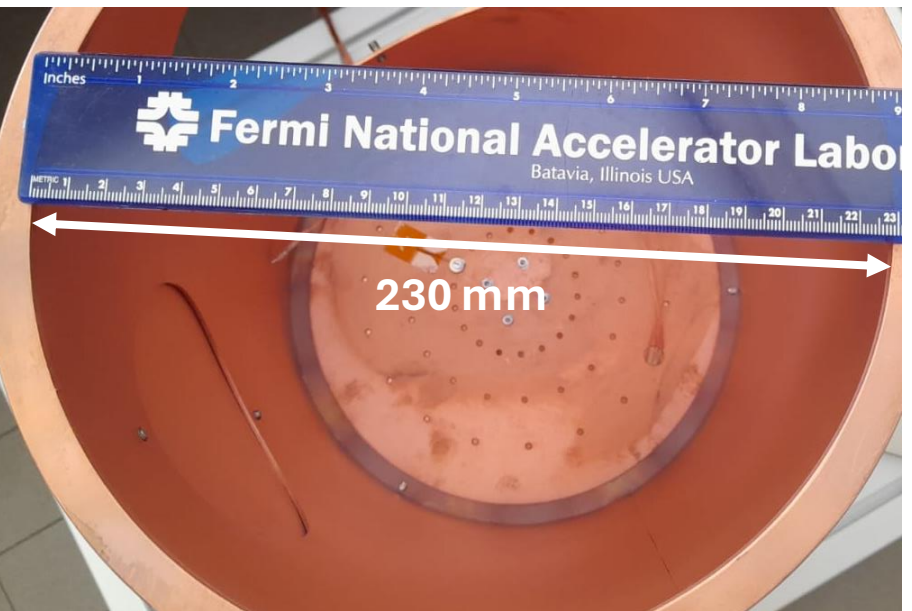
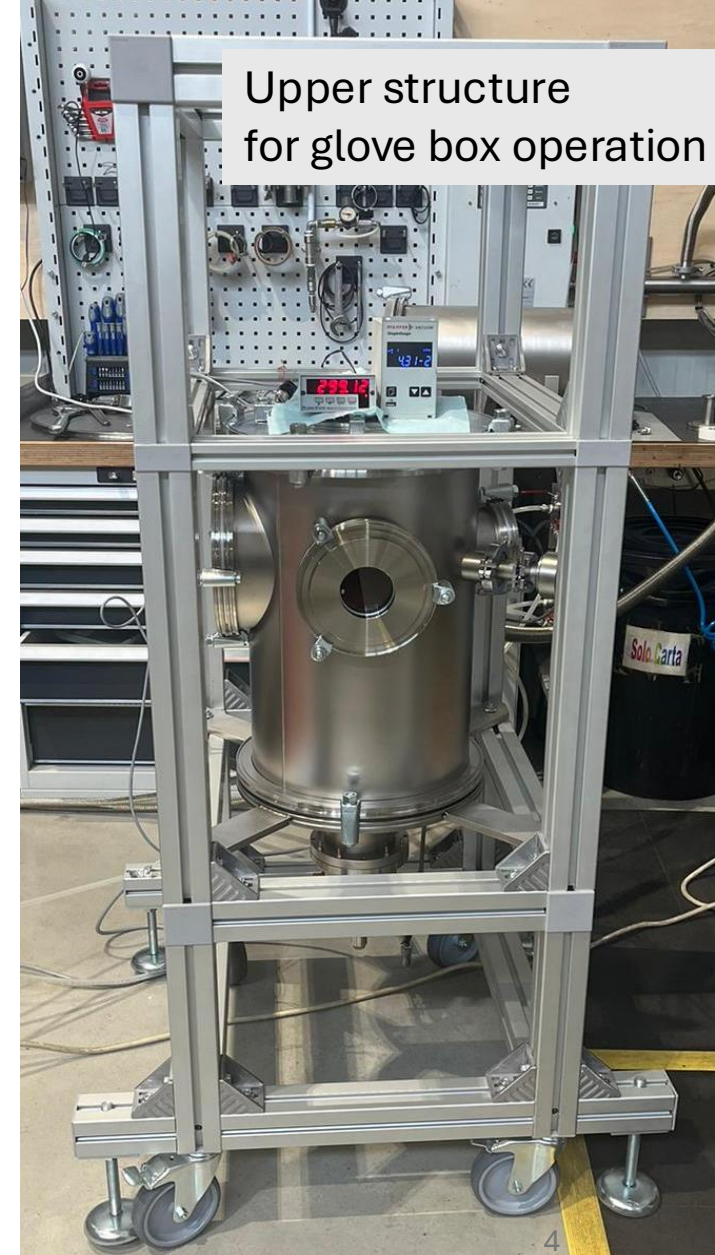
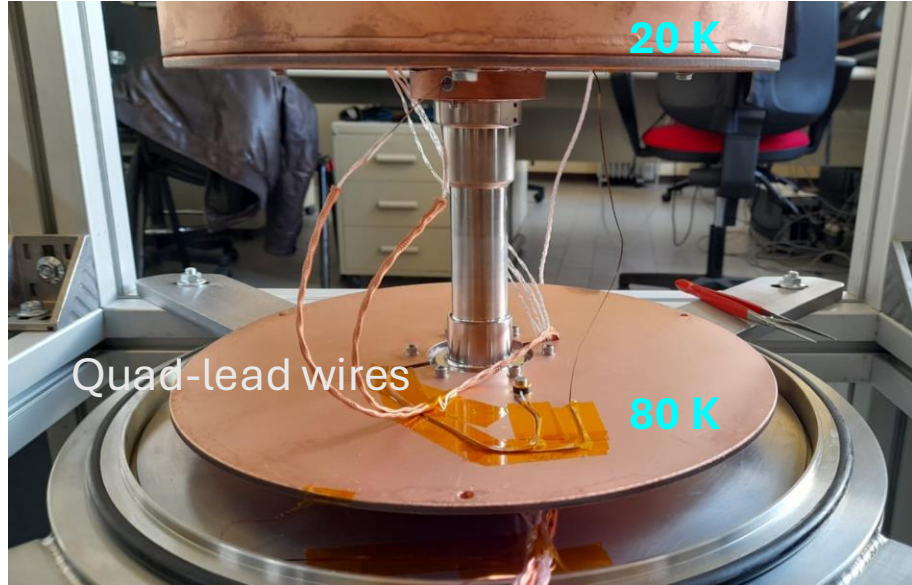


But any number of similar flanges
can be mounted

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4 temperature sensors: 2 Si for cryostat operation + 2 PT100(0) for sample monitoring

Shield holes can be covered if the optical windows are not in use



A complete system

1. CTI-CRYOGENICS® 8200 COMPRESSOR (He, dual stage)
2. Chiller: SMC HRS040-AF-20 air cooled, 4.5 kW cooling power
3. Pumps: Edwards T-Station 300 (primary + turbo)
 1. Pirani-penning single P sensor + controller
 2. Fully automated: switch on and go for coffee
4. Temperature controller: Lakeshore 336, 4ch



How to use it?

- Send an email:
davide.dangelo@unimi.it
andrea.zani@mi.infn.it
 - Come visit the facility
 - Make your sample holder
 - Take a short tutorial with us
 - Book your time
 - Run!
 - [moving the system to a different location is technically possible, to be discussed upon need]
- Expression of interests so far:
 - Astaroth (D.Dangelo)
 - Dune (M. Lazzaroni)
 - ATLAS (S. D'Auria)
 - ASIC design (V. Liberali, A. Stabile)
 - Fisica Nucleare GAMMA e R&D N3G (A. Pullia, S. Leoni, S. Capra, G. Benzoni, B. Million)

Backup

Financial breakdown

Spese 2023:

- Criostato (ditta Mori di Parma): 40.2 k
 - Testa fredda
 - Compressore He
 - Linee He
 - Camera a vuoto
 - con passanti flangiati
 - N.2 schermi in rame
 - N.2 finestre ottiche
 - Struttura di supporto

INFN: 53.5 k

Dip: 14.9 k

Totale 68.4 k

Spese 2024:

- Chiller: 4.4 k
- Gruppo di Pompaggio: 10.5 k
- Controllo temperatura: 12.6k
 - Controller Lakeshore
 - Heater
 - N.2 sensori al Si + cavi criogenici
- Flangia connettorizzata: 0.7 k

Astaroth: 9.7k

Dune: 3k

Dot 1: 4k

Dot 2: 7.5 k

Dot 3: 3k

Direzione: 26.3 k