



AHEAD 2020

INTEGRATED ACTIVITIES FOR THE HIGH-ENERGY ASTROPHYSICS DOMAIN

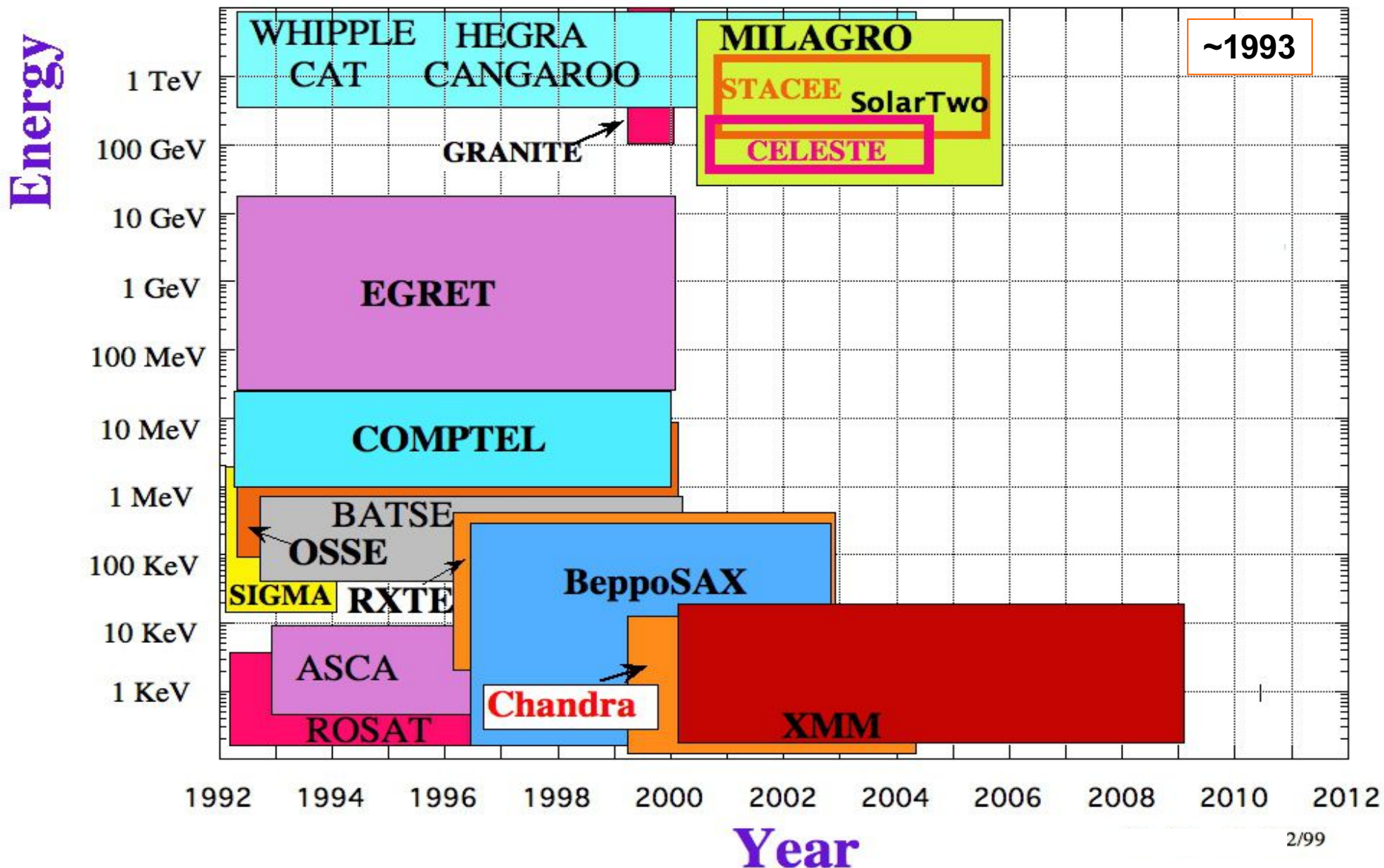


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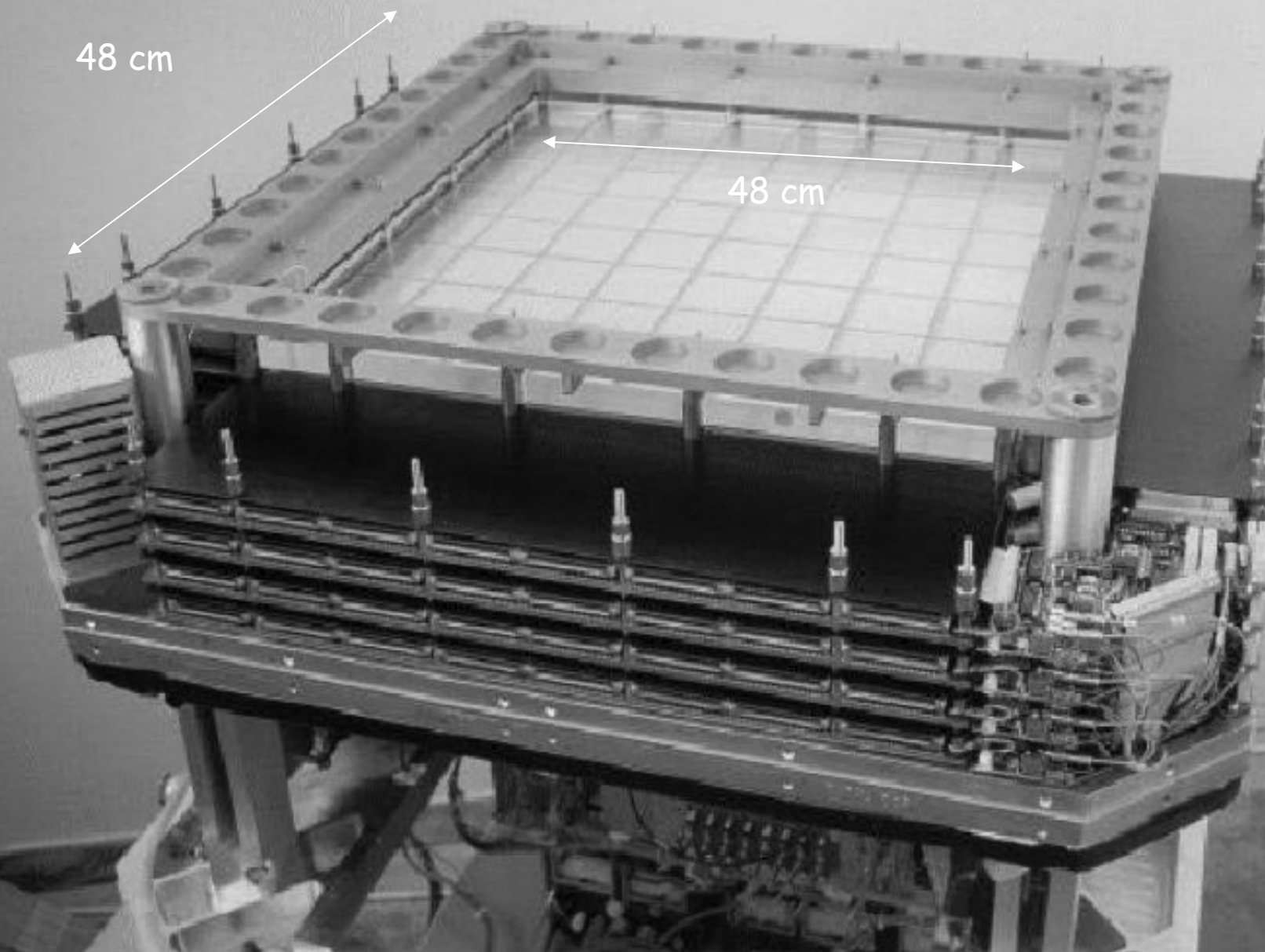
Research Facilities and work plan in Roma Tor Vergata

Aldo Morselli, Vincenzo Vitale
INFN Roma Tor Vergata

High Energy Gamma Experiments Experiments



The TS93 and CAPRICE silicon-tungsten imaging calorimeter.



The CAPRICE 94 flight





A wide aperture telescope for high energy gamma rays detection

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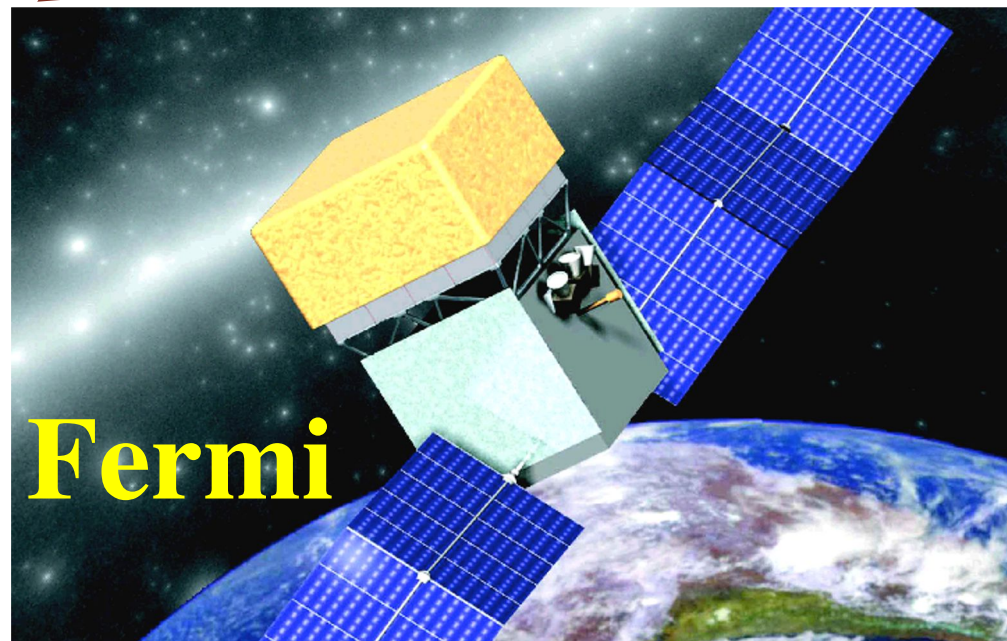
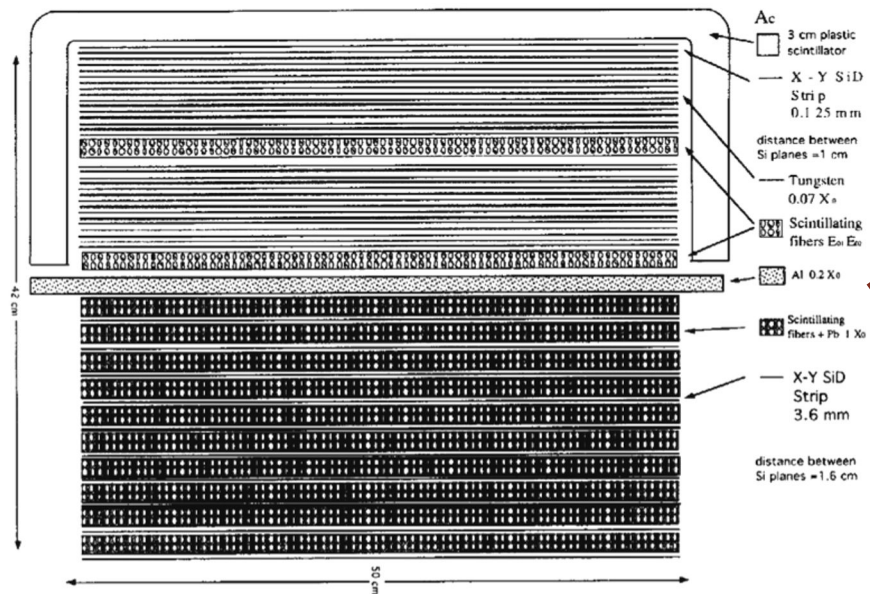
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In this paper new techniques for the realization of a high energy gamma-ray telescope are presented, based on the adoption of silicon strip detectors and lead scintillating fibers. The simulated performances of this instrument show that the silicon strip technology adopted by GILDA (Gamma-ray Imaging Large Detector for Astrophysics) could improve the performance of EGRET, which is so far the most successful experiment of a high energy gamma-ray telescope, though having less volume and weight.

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GILDA

GILDA



For the construction of Fermi detector we built a facility for thermal-vacuum test of the silicon planes



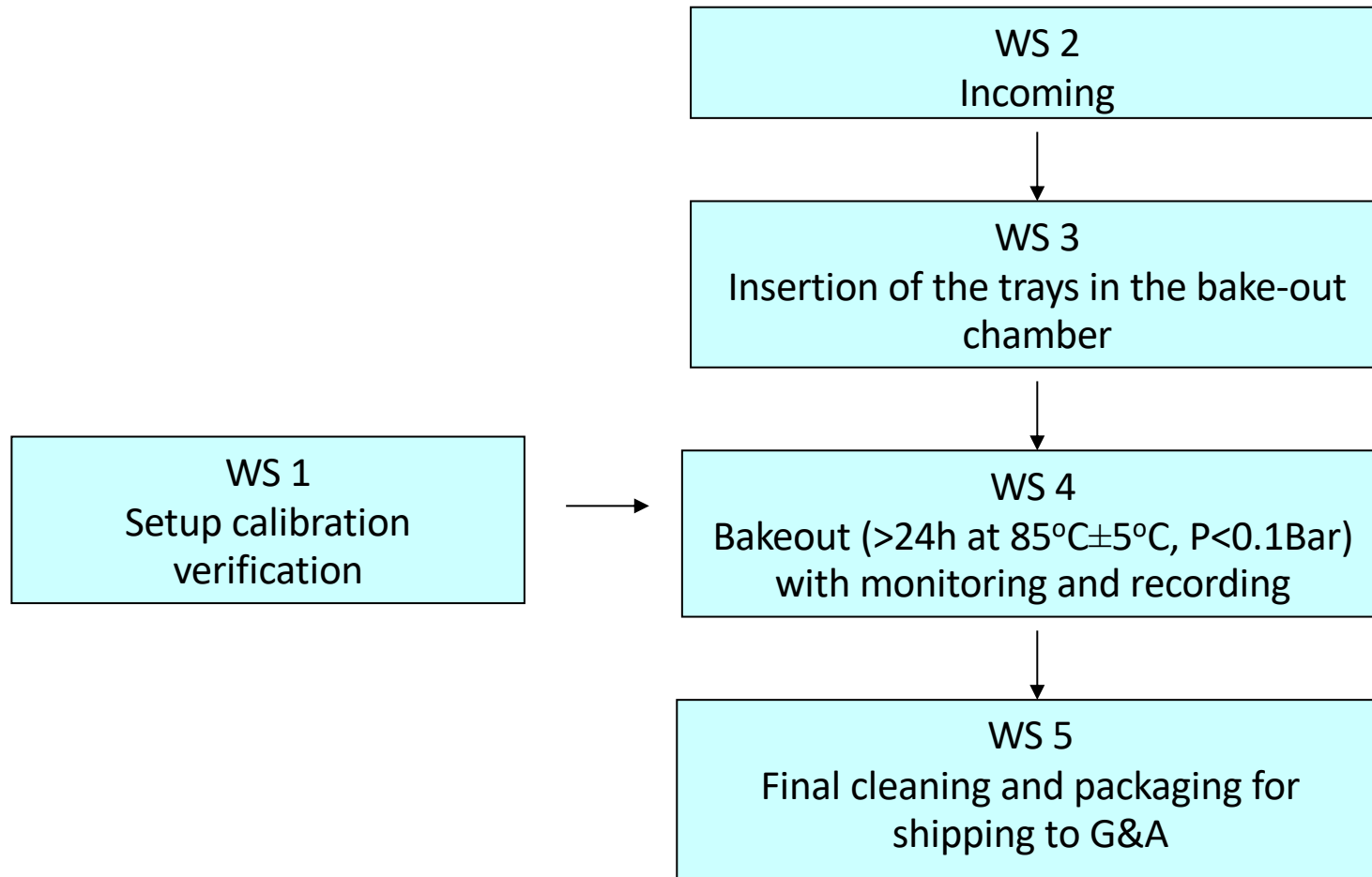
Vacuum chamber: custom type, inox steel, cylindrical (internal radius 110cm, height 90 or 180cm as needed).

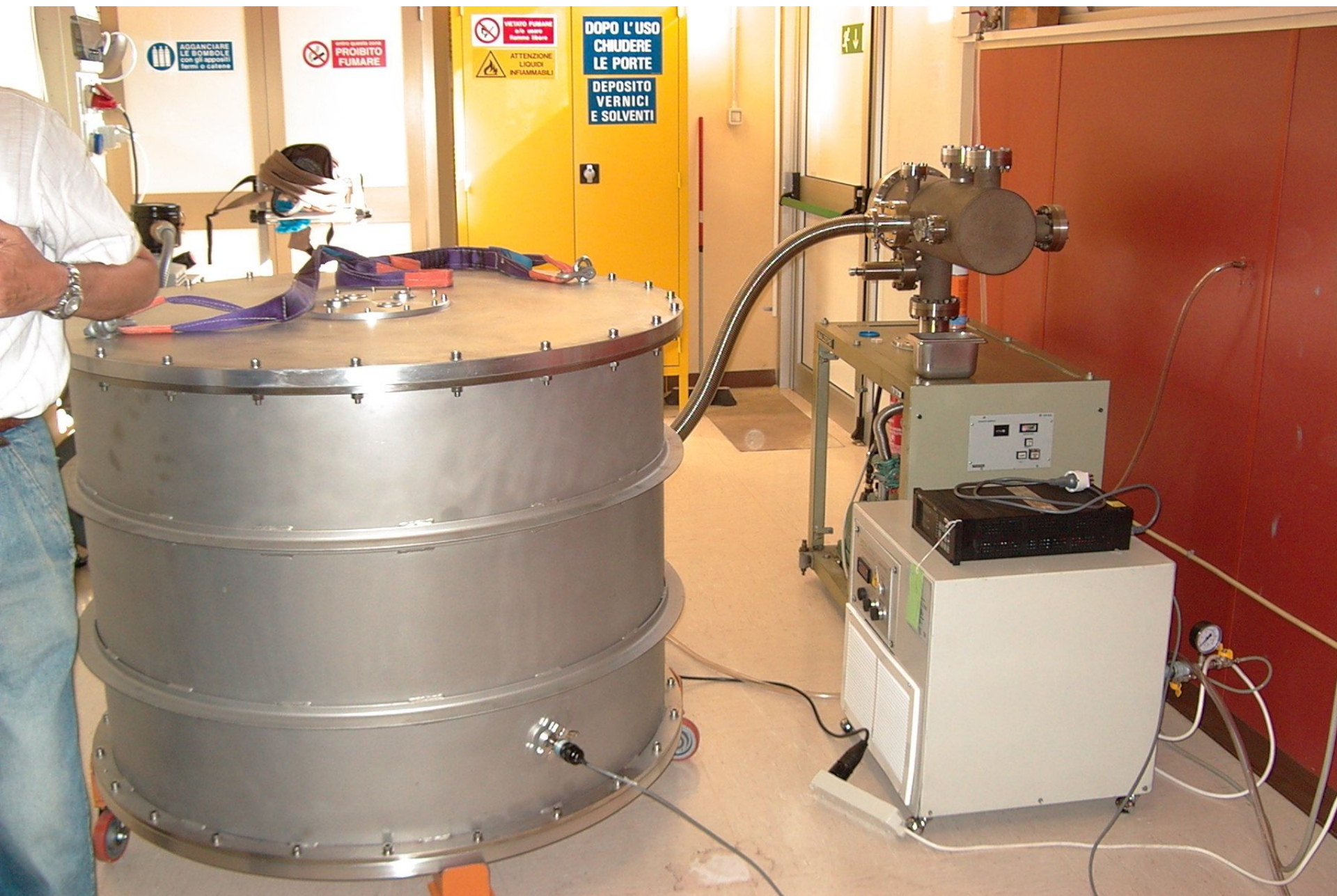
Vacuum system:

with Rotative Pump (capacity: $16\text{m}^3/\text{min}$): $10\text{E}-2$ atm;

with Turbomolecular Pump (capacity: $250\text{m}^3/\text{h}$): $10\text{E}-3$ atm and less.

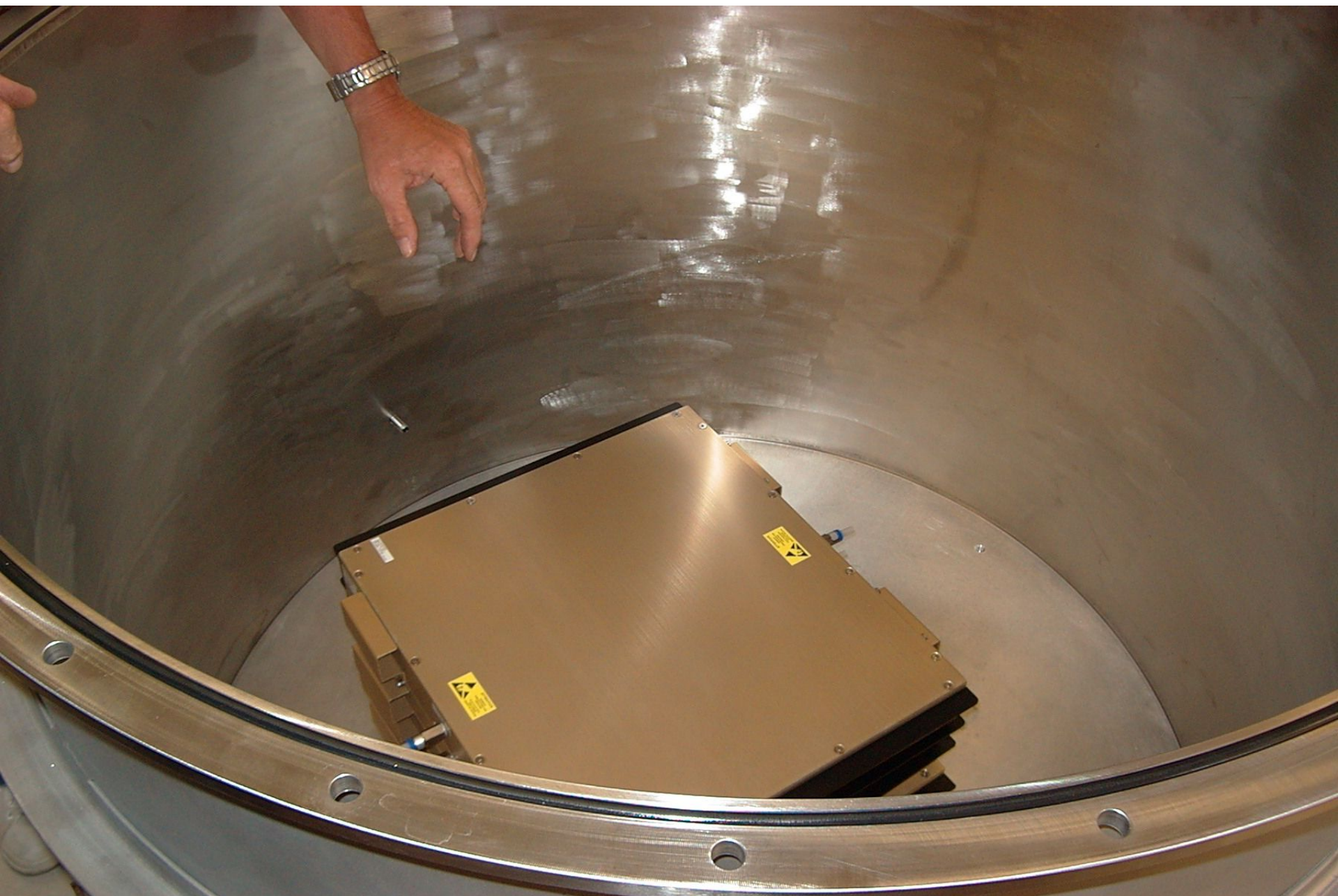
Bake-out flow diagram



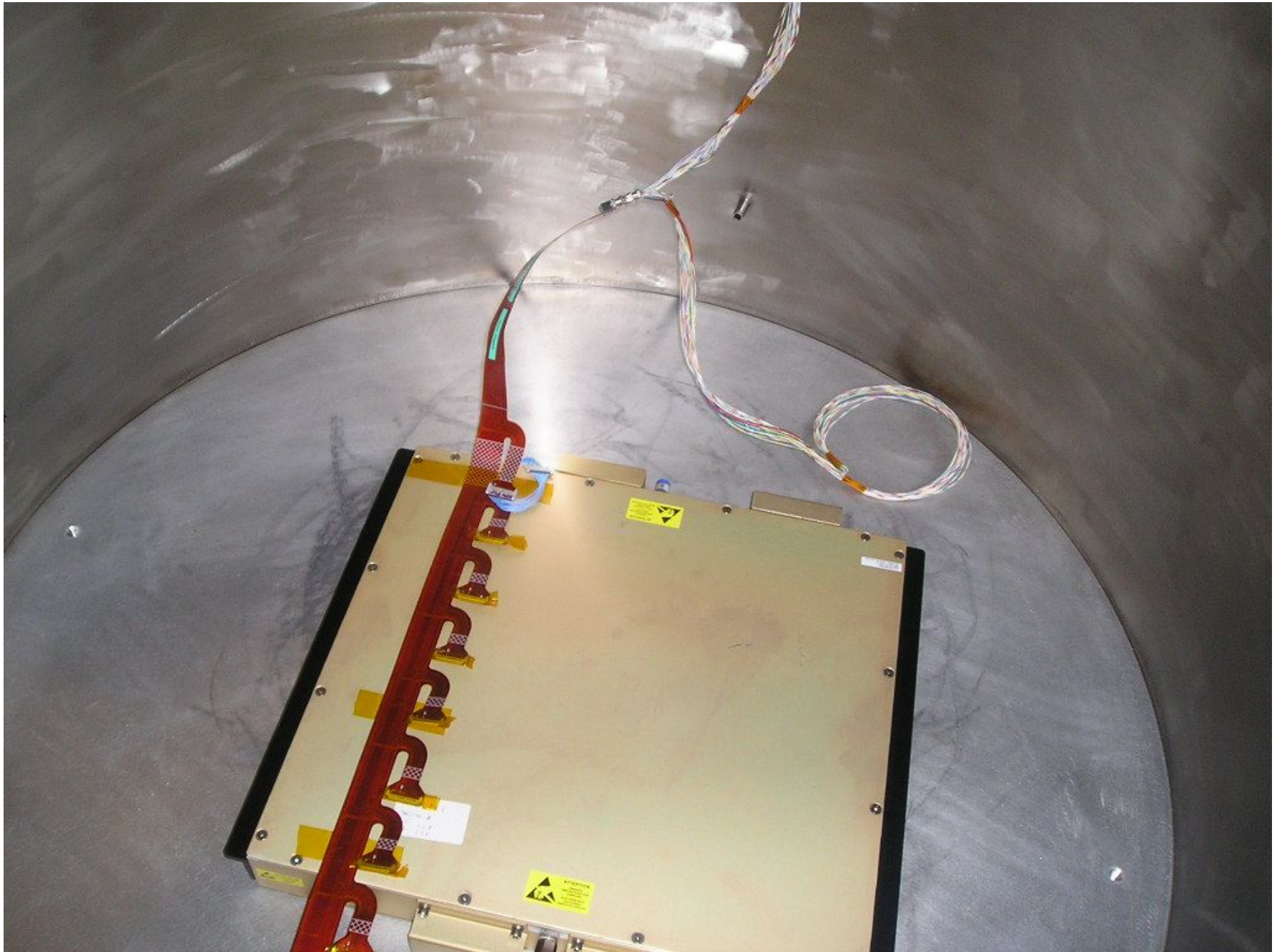


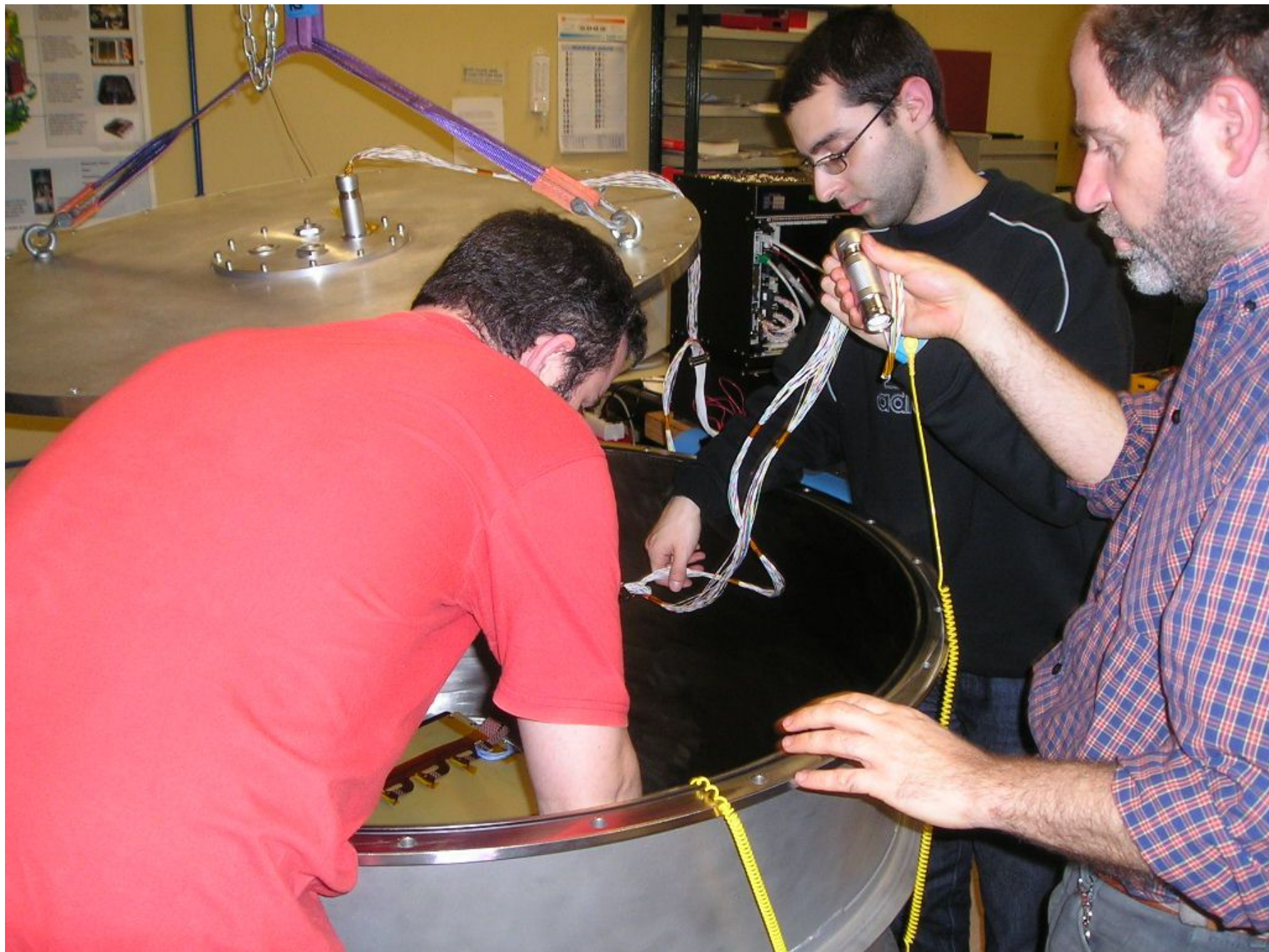


Fermi silicon detector inside the chamber

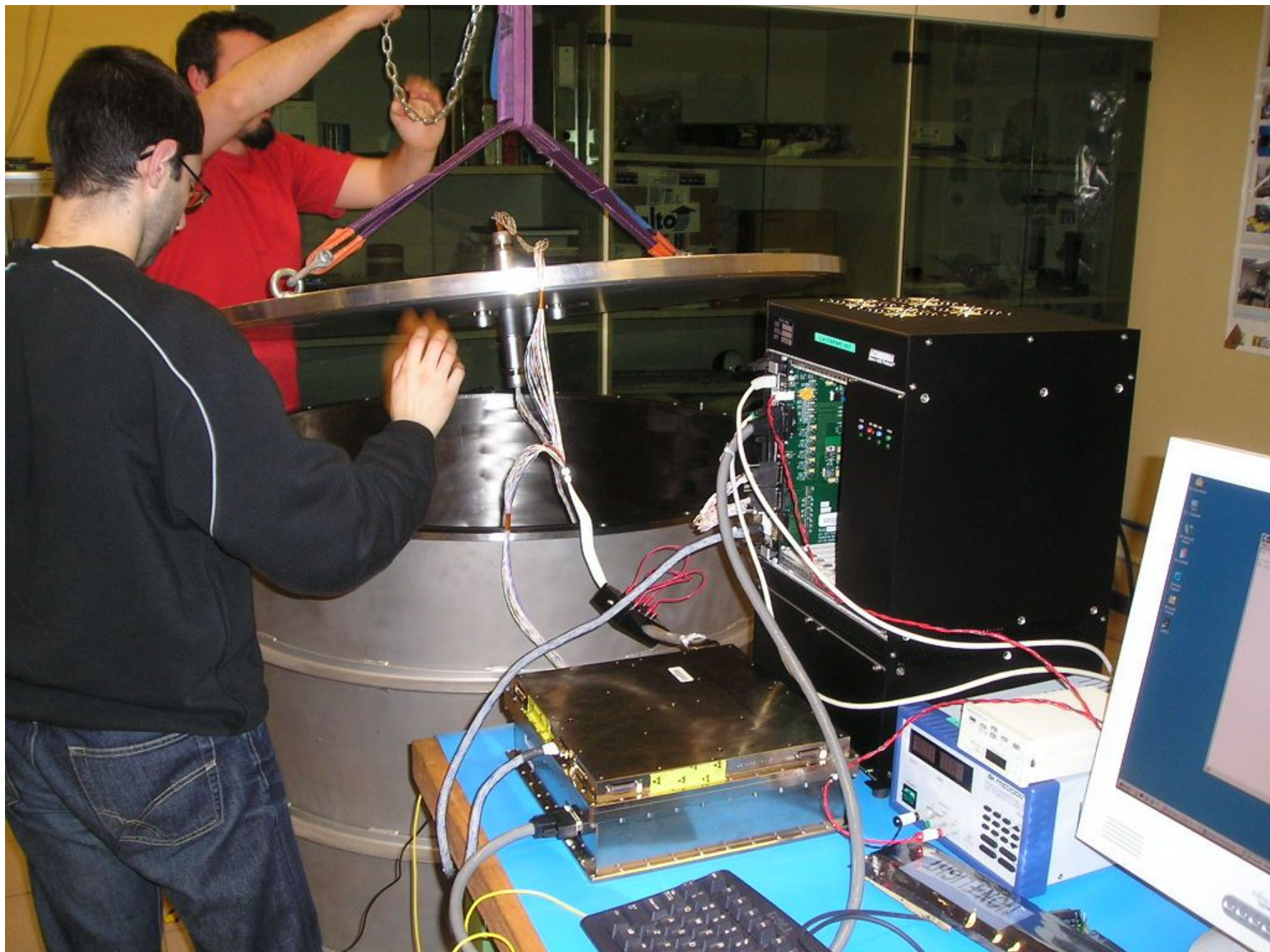


Fermi silicon detector planes inside the chamber





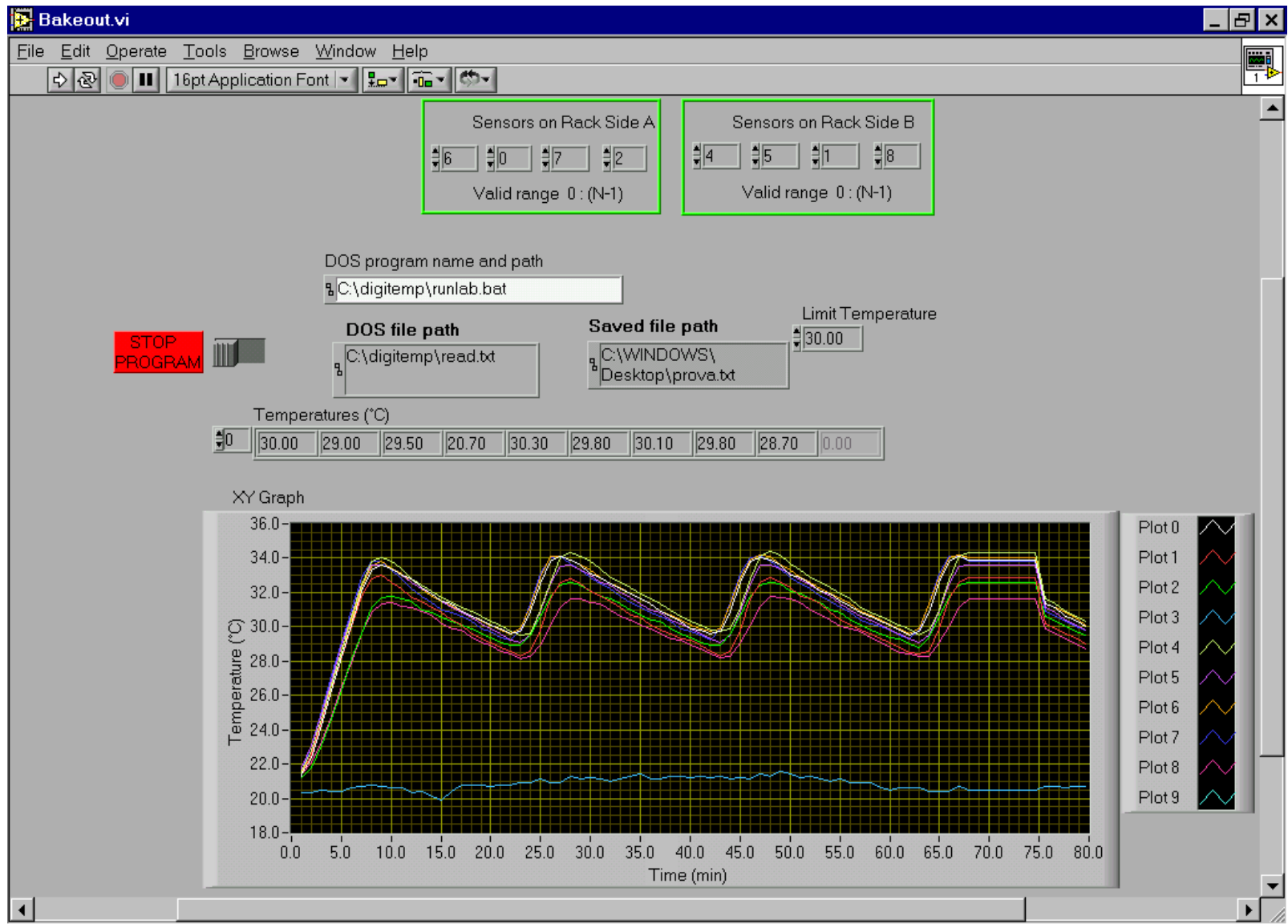
Closing of the Vacuum chamber





taking data





Temperature Control and Record

View of the first tray after the thermo-vacuum cycle



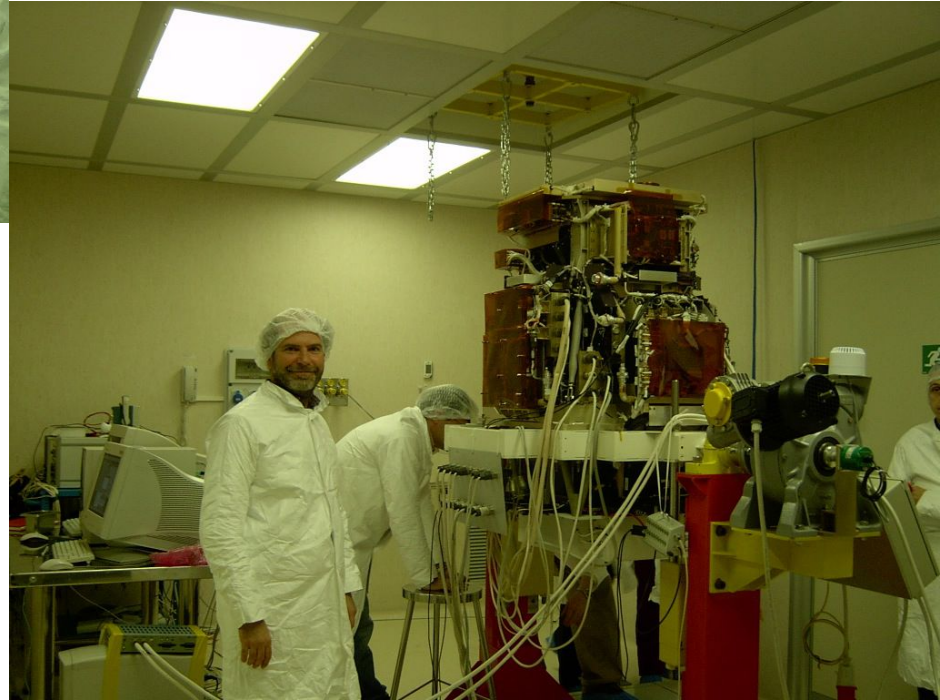
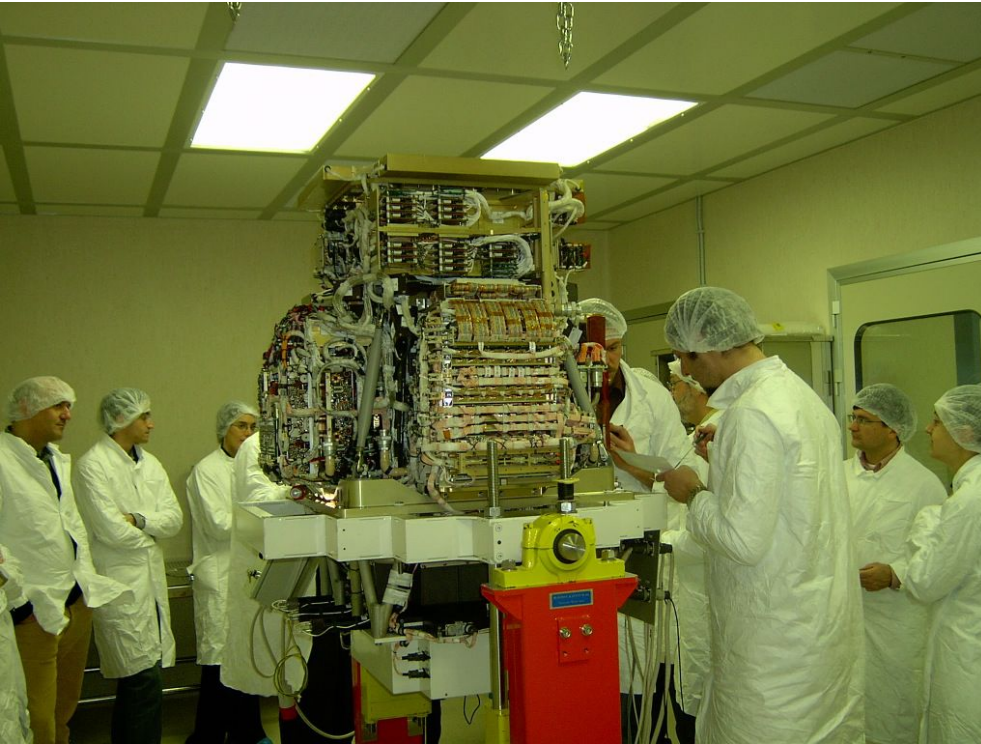
View of the clean room in Roma Tor Vergata



Fermi trays test in the clean room

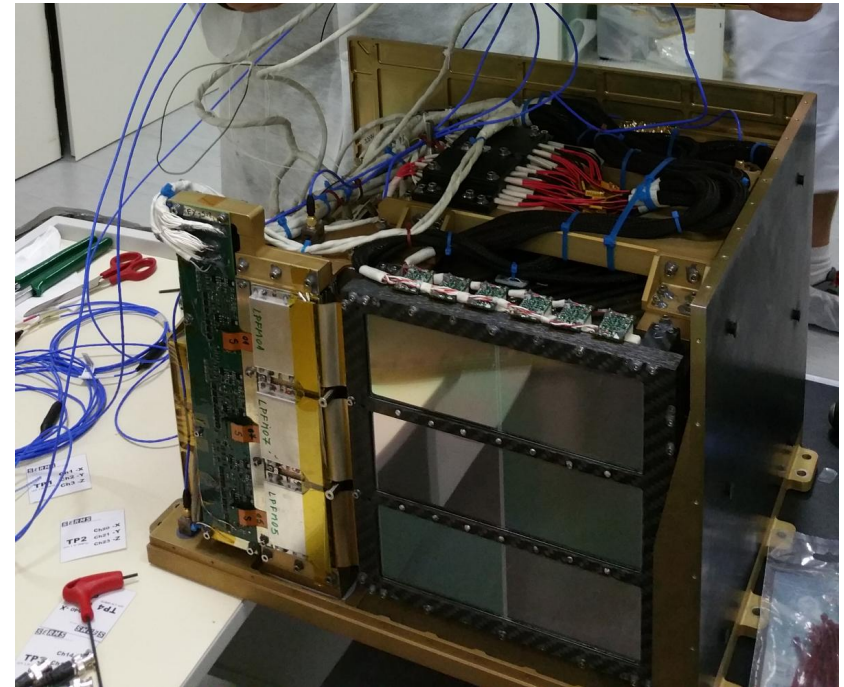


Pamela integration



High Energy Particle Detector Integration

- High-Energy Particle Detector (HEPD) is a range-calorimeter for the near-Earth measurement of electrons, protons and light nuclei fluxes up to few hundreds of MeV
- On board of the China Seismo-Electromagnetic Satellite (CSES), launched in Feb 2018
- Four HEPD versions were built (2016-2018) and integrated at the Tor Vergata lab:
 - -the Electrical Model (EM),
 - -the Structural and Thermal Model (STM),
 - -the Qualification Model (QM)
 - -the Flight Model (FM).

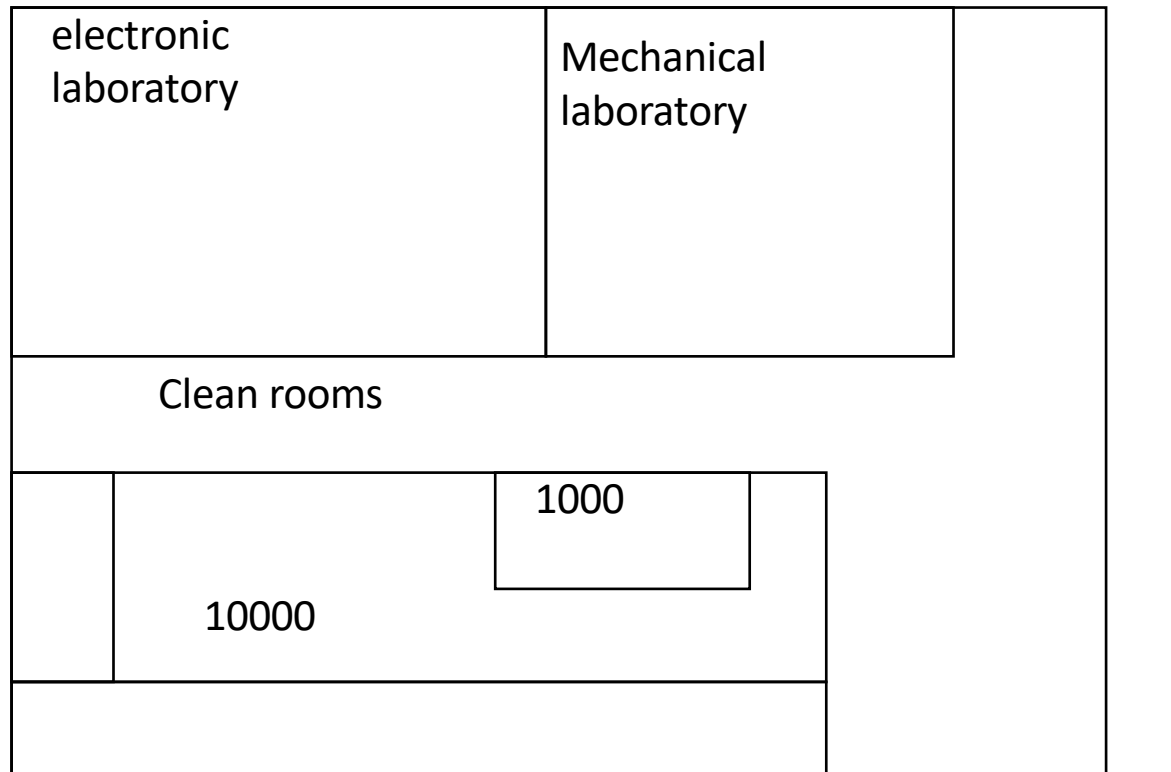


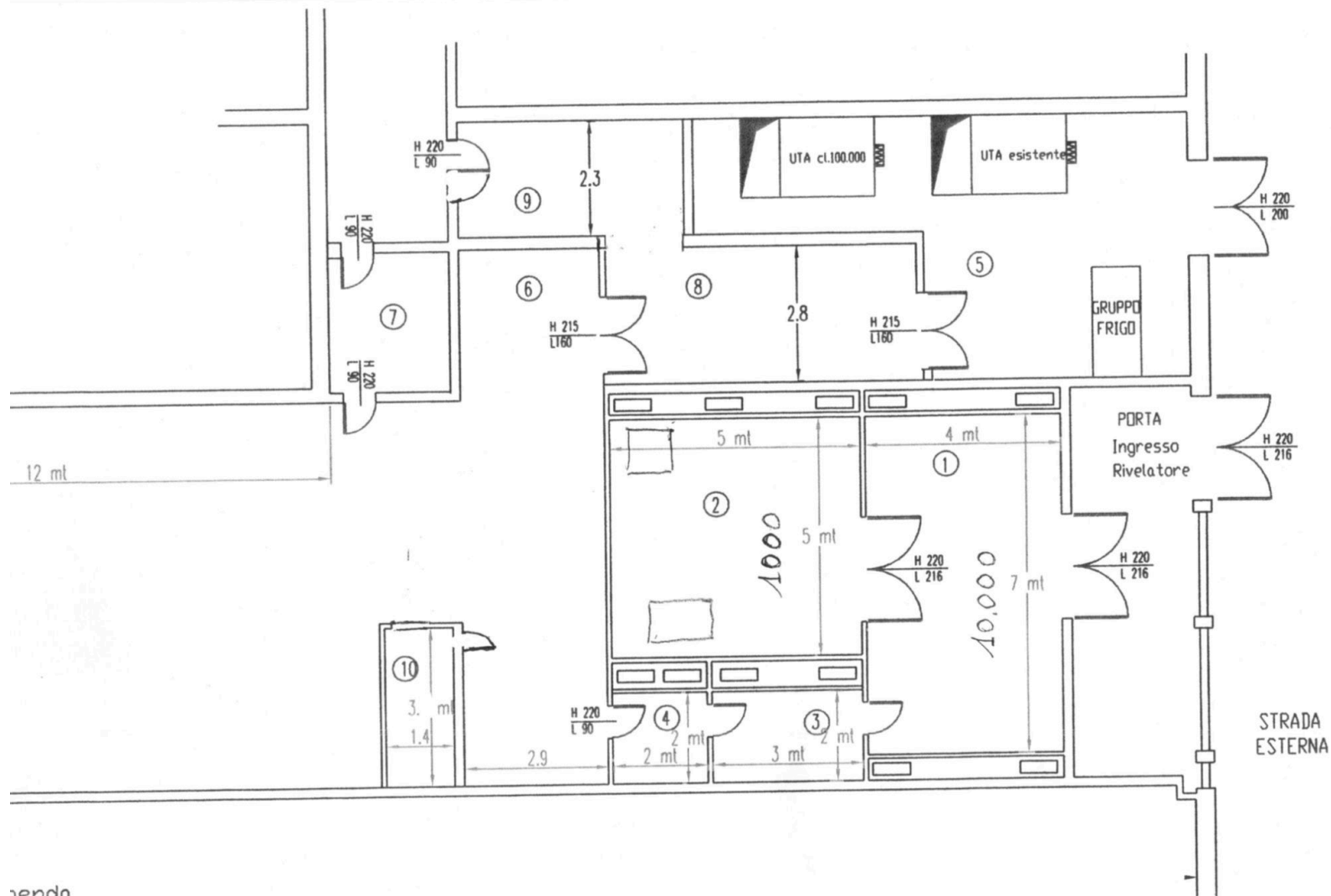
HEPD flight model in Tor Vergata

Roma 2

~ 40 m

~ 20 m





genda

ALE CL 10000 (esistente)
A CLASSE 1000 (esistente)
TIZIONE(esistente)
RESSO(esistente)

5 - LOCALE tecnico vecchio e nuovo
6 - LOCALI CLASSE 100.000(nuovo)
7 = VESTIZIONE(nuova) CL 100.000
8 - 9 locali a disposizione
10 locale tecnico

Item nr	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference	
Designed by Nuova Impas		Checked by Nuova Impas	Approved by - date I.N.F.N.	Fidname 0130097	Date xxx	Scale 1:100
NUOVA IMPAS s.r.l.				CAMERA_BIANCA_I.N.F.N		

- We can use the same facility for the test of the AHEAD nanocube