

Laboratorio Criogenico per Astrofisica X in INAF/IAPS: Facilities Criogeniche & Sviluppo di Microcalorimetri TES

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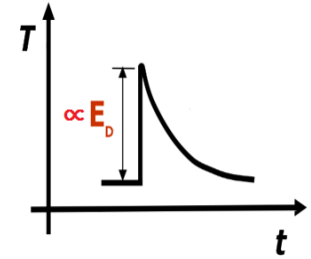
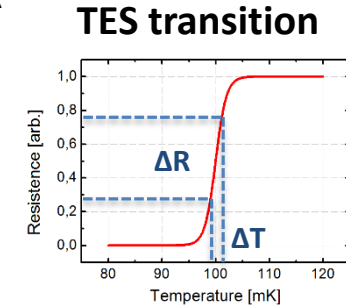
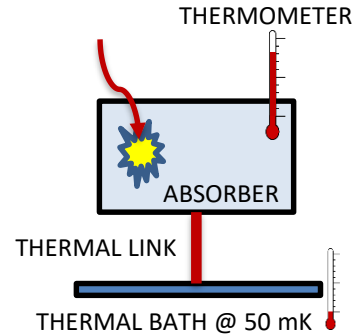


Visita virtuale lab @ https://www.teravista.it/inaf_iaps/

• Superconducting Transition Edge Sensors (TES) Microcalorimeters

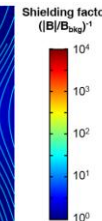
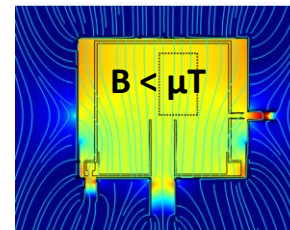
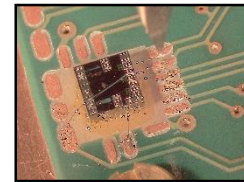
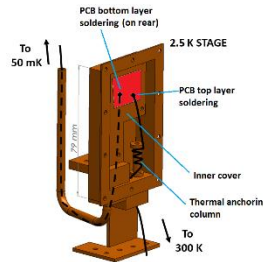
Cryogenic detectors ($T \sim 100$ mK), wide applications:

- Single photon counting from Visible to Gamma-rays + Bolometric application in mm band
- Thousands of pixels + High spectral resolution for X-rays (2 eV @ 6 keV)
- High quantum efficiency \rightarrow Rare event physics (dark matter search, neutrino physics, ...)



• Our Cryogenic Laboratory for X-Ray Astrophysics @ IAPS

- Cryogenic operations down to 10 mK
- Development of cryogenic low-noise electronics based on SQUID (Superconducting Quantum Interference Device)
- Cryogenic and Warm Magnetic shielding + EMI filtering at cold
- Clean room (ISO7/ISO5) for space items integration under design phase



Dilution Refrigerator



ADR

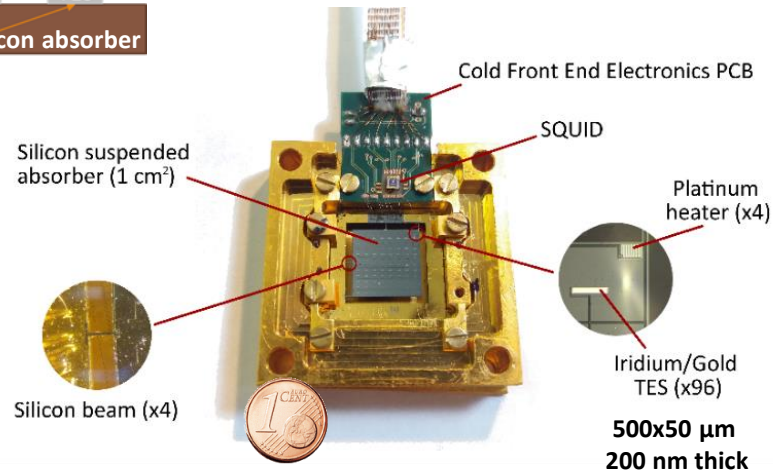
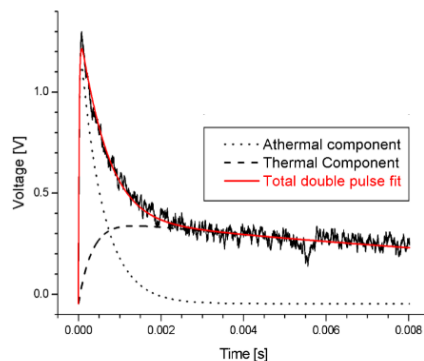


• Our cryogenic particle detector: the CryoAC (Cryogenic AntiCoincidence)

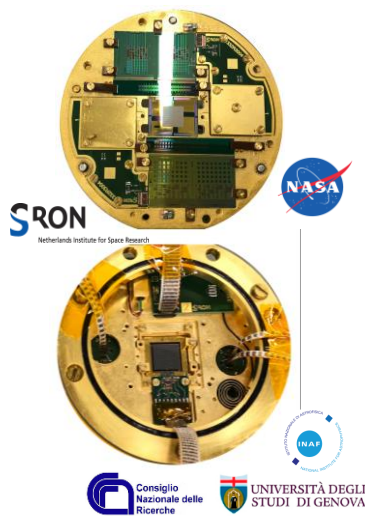
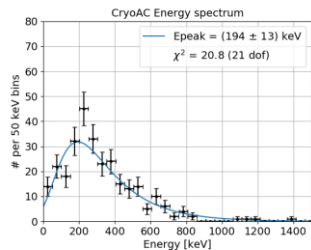
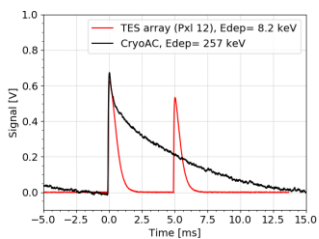
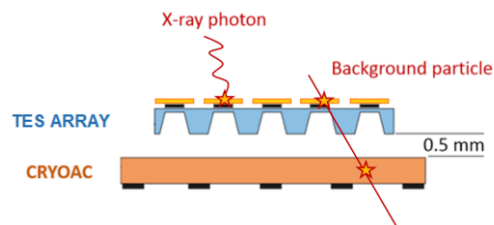
A fast (10 μ s accuracy) «macro»calorimeter (cm² area) for low-background applications

- 6 keV – 2 MeV bandwidth
- 99.99 % required trigger efficiency
- On-chip heater for self-calibration
- 40 pW power dissipation at cold

Fully designed and developed in Italy
INAF (Design & Integration & Test)
UniGenova (Design & Production) +
CNR/IFN (Electronics)



• ATHENA X-IFU AntiCoincidence demonstration



• Next models (STM, EM)

- Scaled 4-pixels hexagonal-shaped detectors for space applications under design

