

LARGE AREA DETECTORS FOR FUTURE X-RAY MISSIONS

(A STORY OF PERSEVERANCE...)

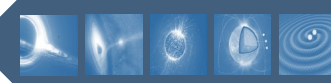
MARCO FEROCI

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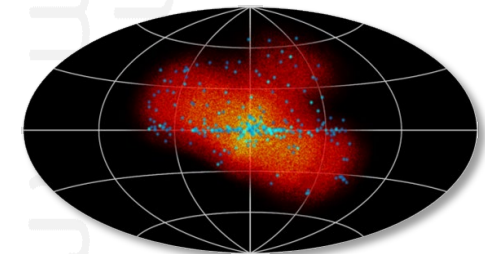
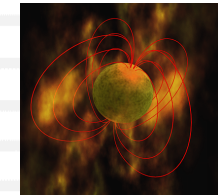
ROME, ITALY

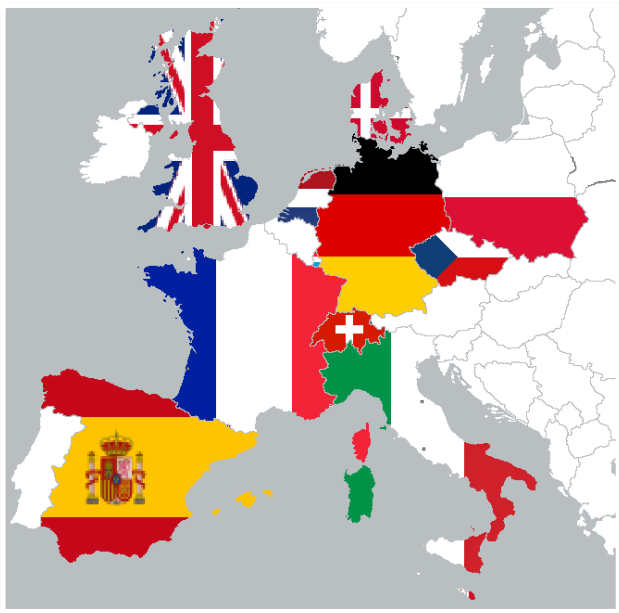
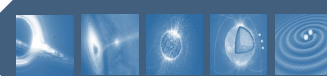


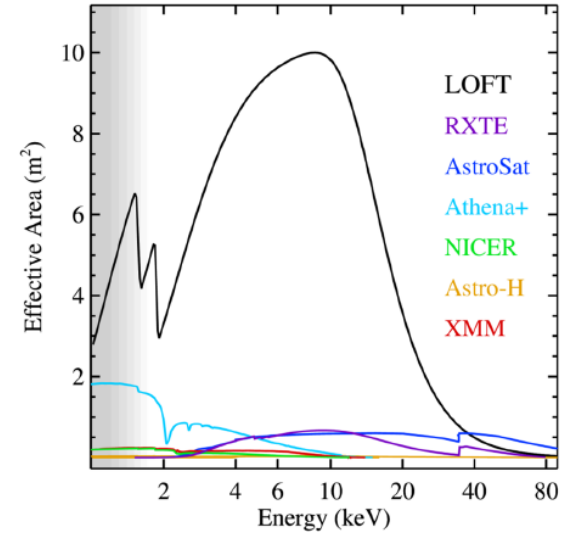
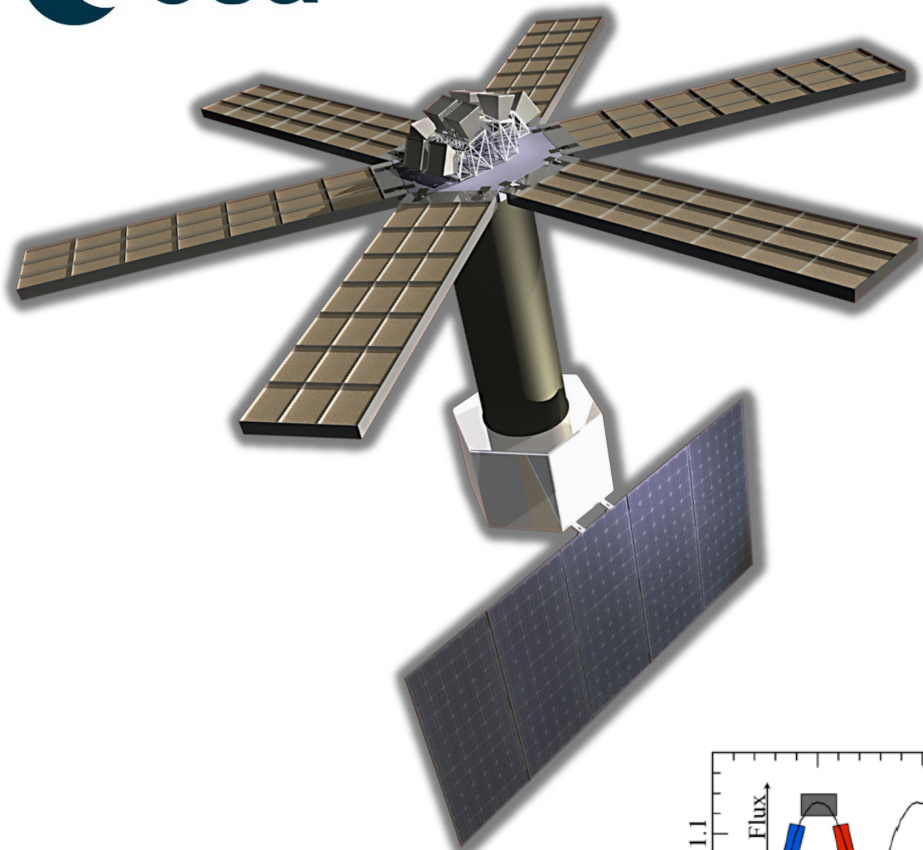
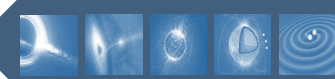


Study of matter under extreme conditions of gravity, density [and magnetism]. [Simultaneous] **high-throughput spectral-timing** [and polarimetry] observations.

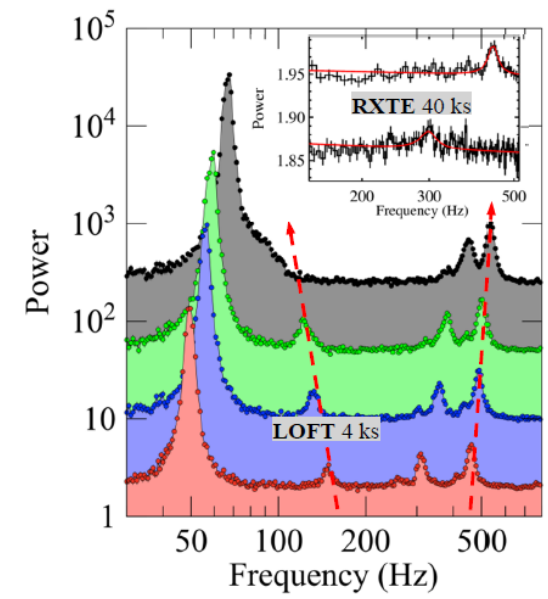
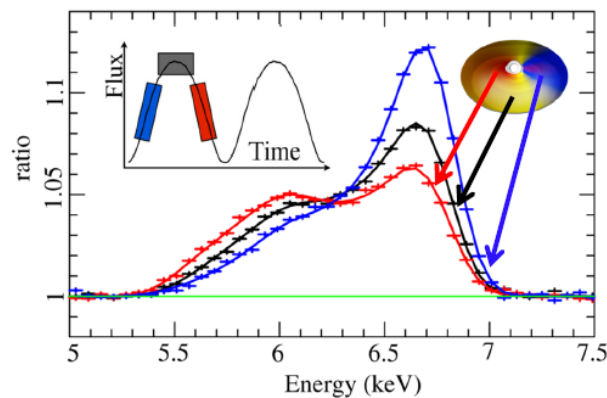
- Constrain the **Equation of state** of the supra-nuclear density matter in the interior of neutron stars.
- **Accretion** physics in the **strong-field** regime of **gravity** and tests of General Relativity in neutron stars and black holes over the mass scale.
- [Physics of light and matter in the presence of **ultra-strong magnetic fields** in magnetars and X-ray pulsars.]
- Multi-purpose **observatory** and wide-field monitoring for transients (and e.m. counterparts of GWs). Rapid follow-up.

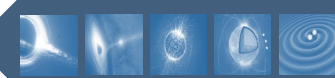




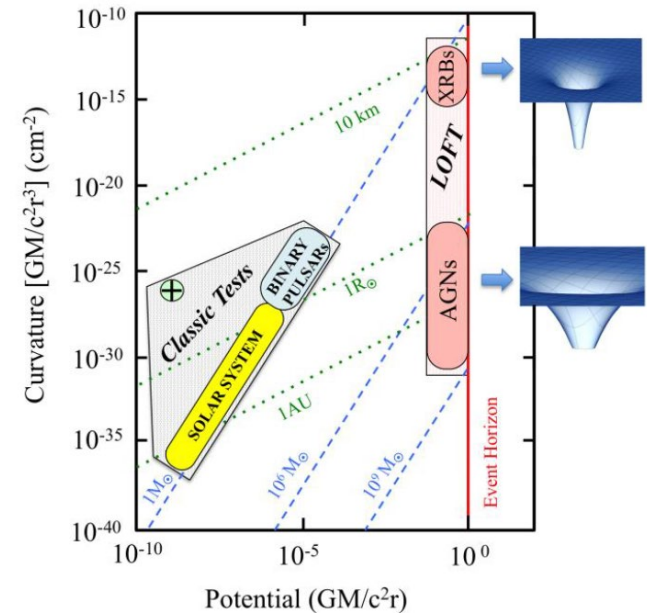
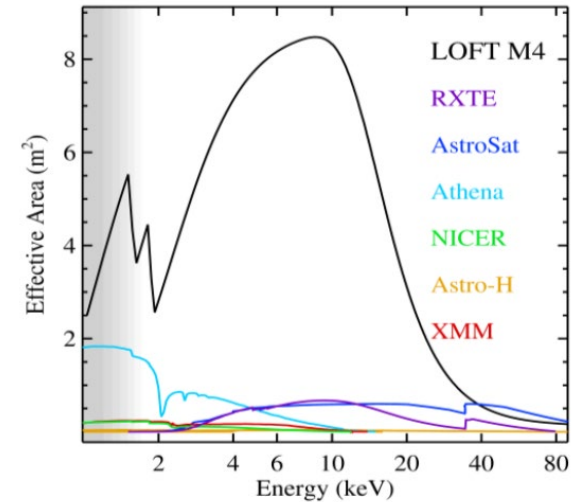


ESA M3 Mission Call
 Selected for a 3-year Phase-A
 study. Not down-selected for
 flight.





ESA M4 Mission Call
Shortlisted for selection, but not
selected for Phase-A study.



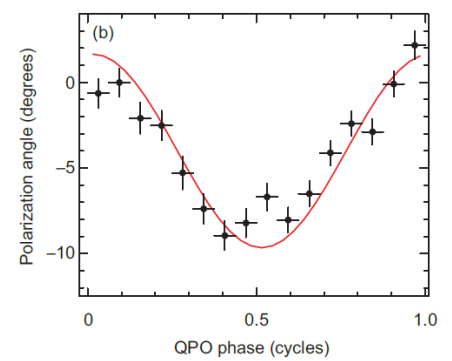
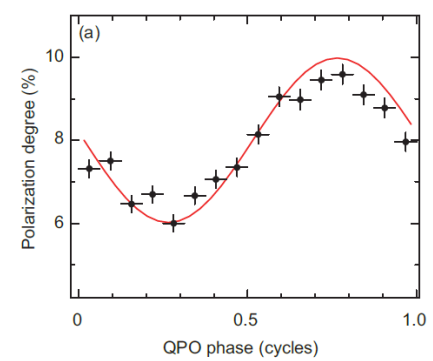
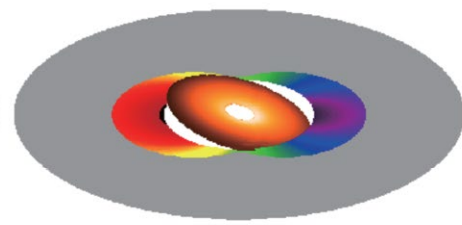
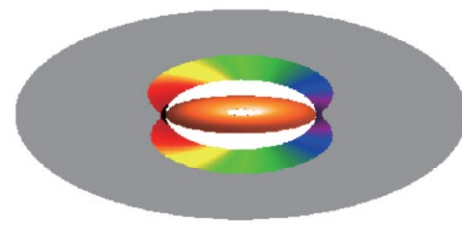


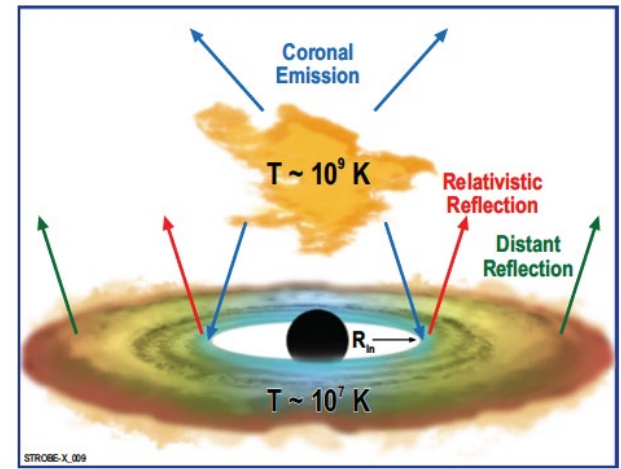
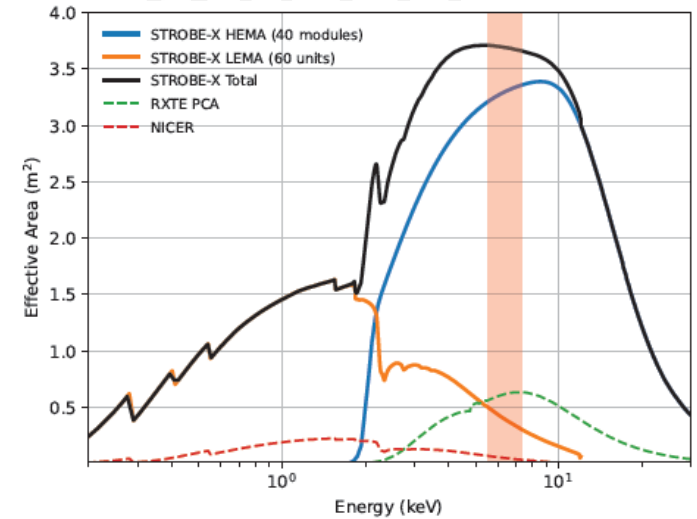
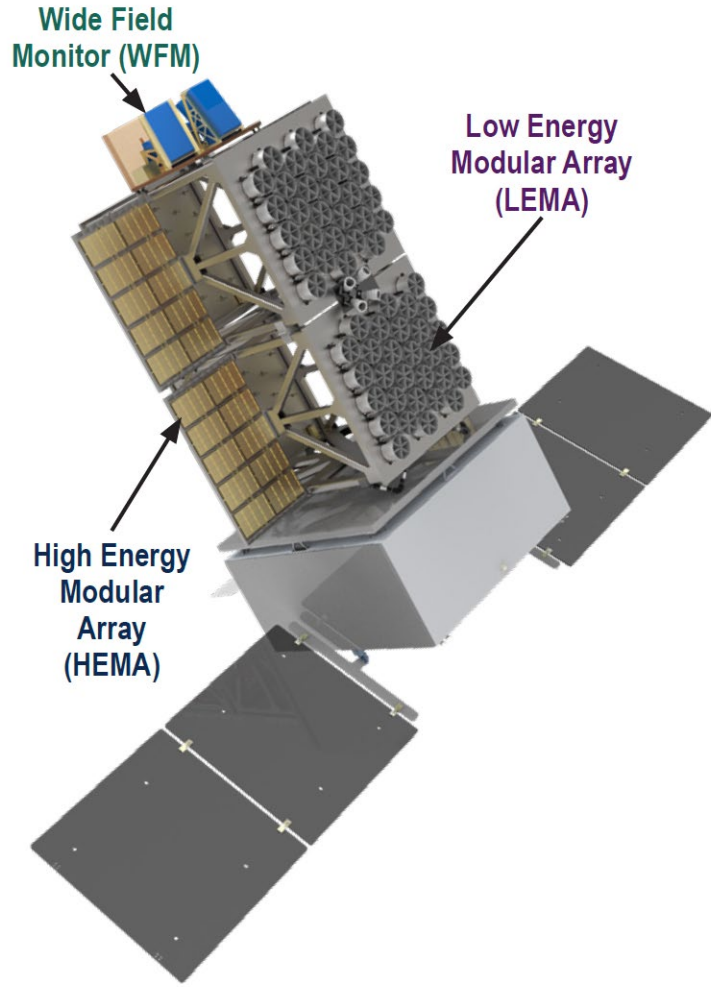
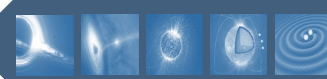
Flagship Mission of the Chinese Academy of Sciences (CAS) with a large (2 out of 4 instruments) European participation.

Phase A study completed in 2017-2019.
 Phase B study completed in 2020-2023.
 ESA (MoO) driven or multi-lateral collaboration welcome.
 Hardware collaboration stopped due to geopolitical reasons.
Scientific collaboration still in place (launch in 2030).

QPO phase ~ 0.5 cycles

QPO phase ~ 0.75 cycles



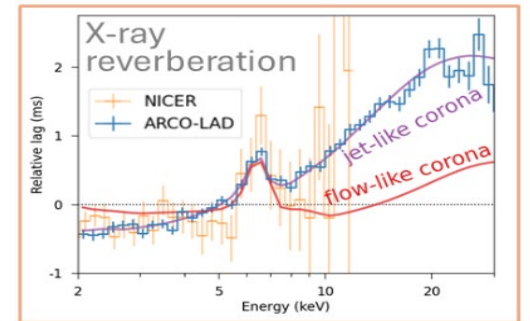
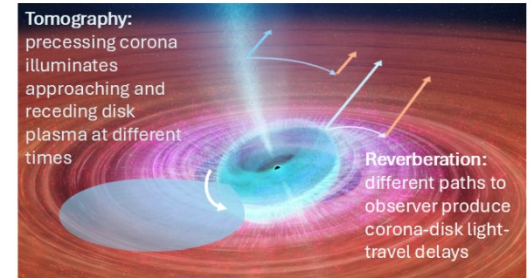
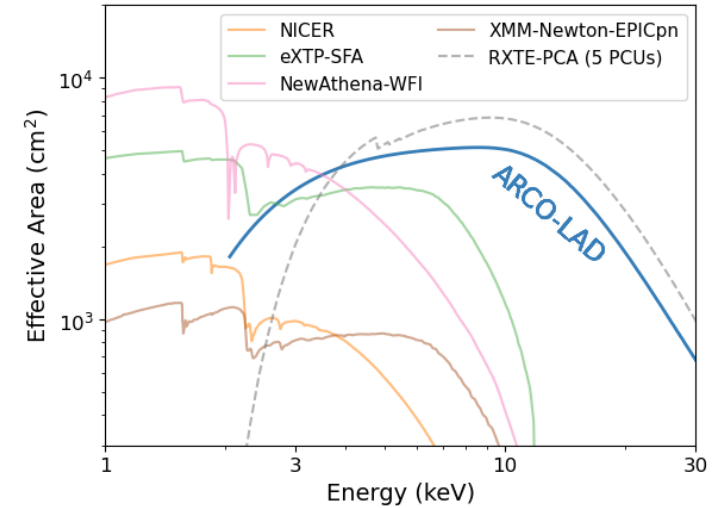
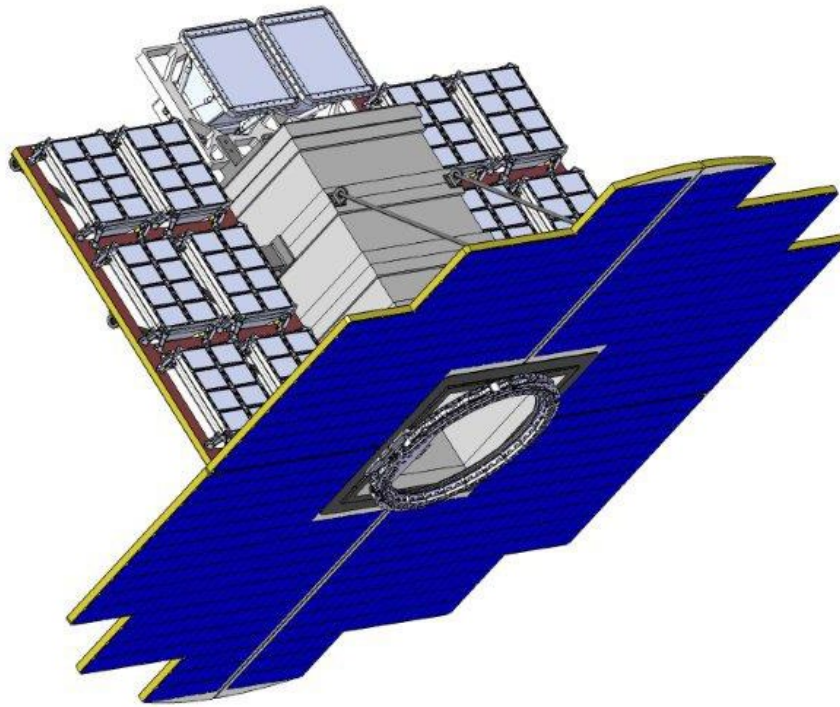
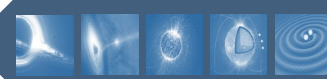


Pre-selected and funded in 2017 for Phase-0 study.

NASA Probe Class Mission Call – 2023

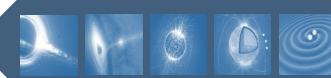
Evaluated as Category I but not selected for Phase A/B study.



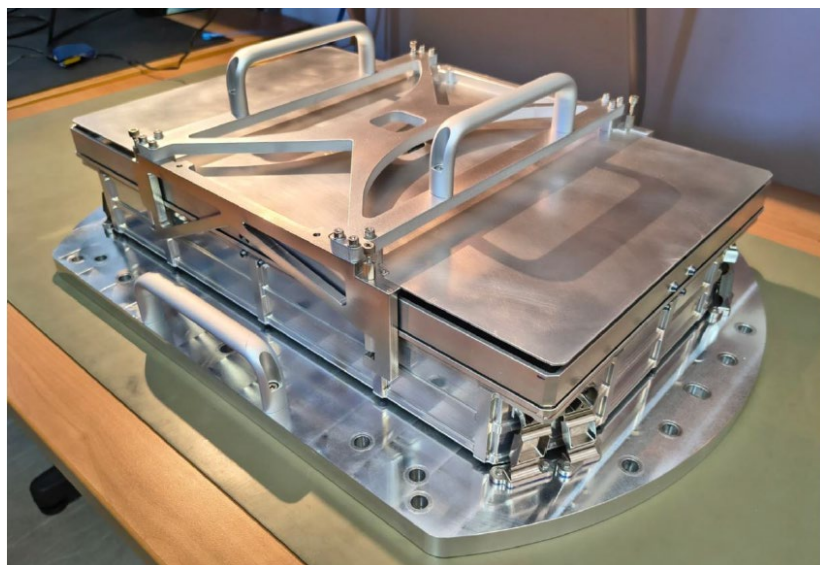
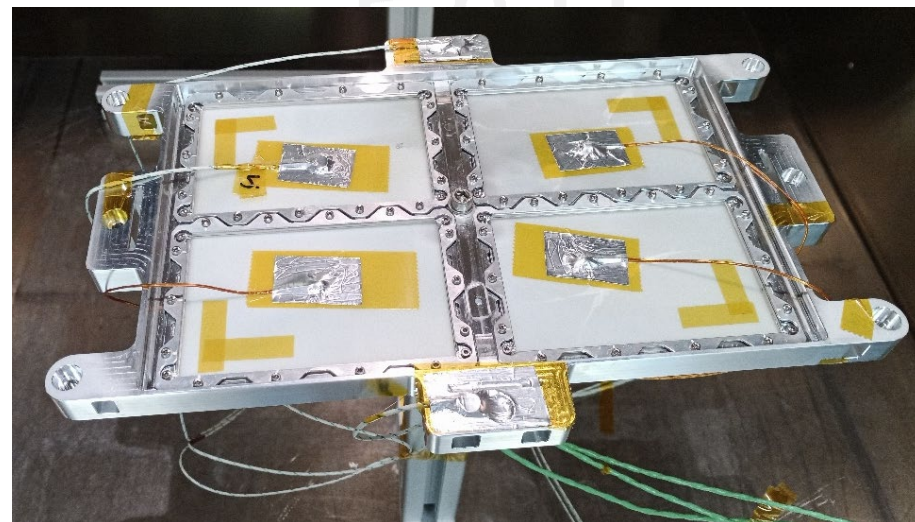
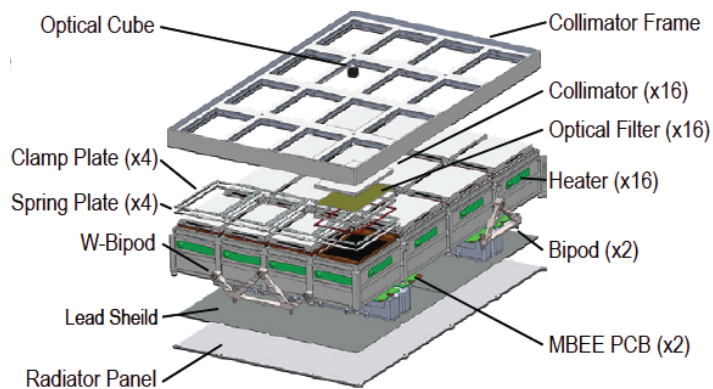


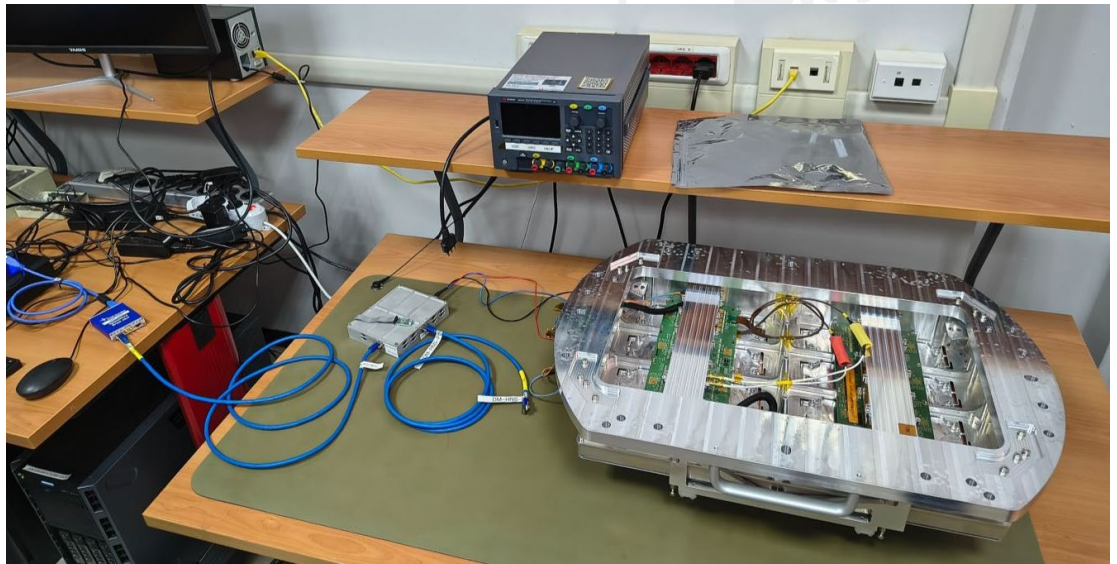
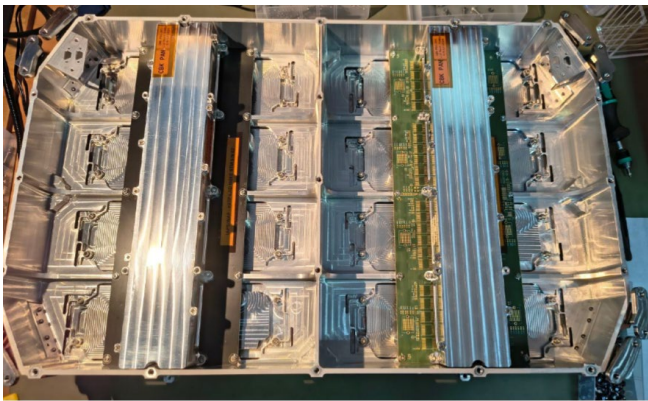
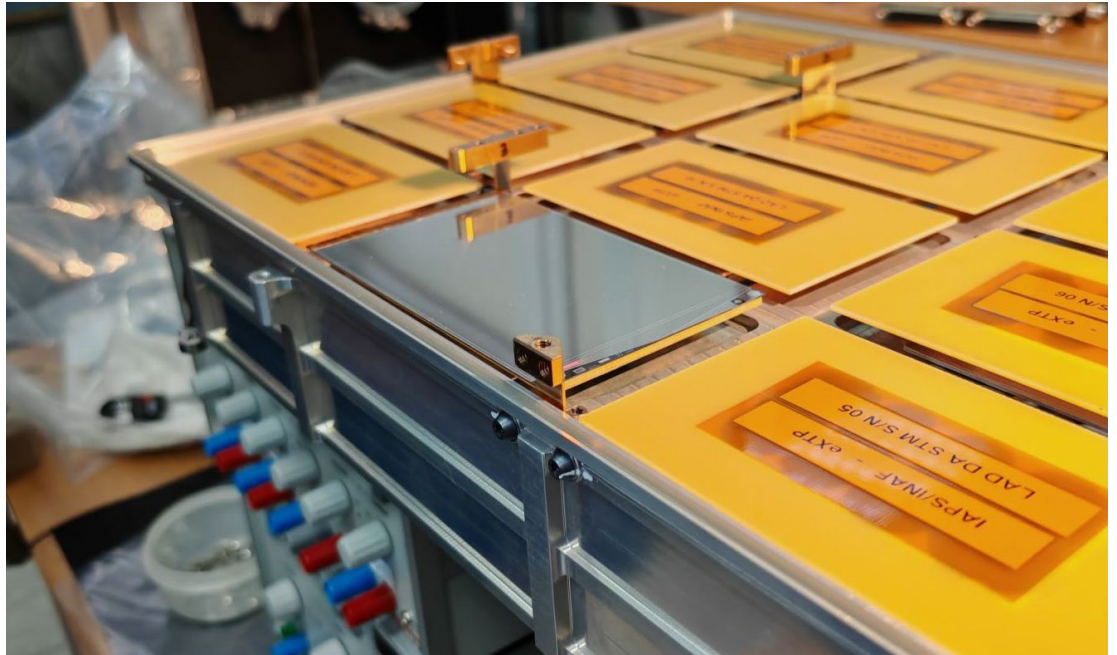
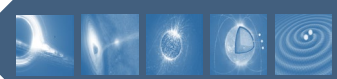
Astrophysics of Relativistic Compact Objects
 ESA F3 Mission Call
 Evaluated as “too complex” for F-mission
 programmatic boundaries

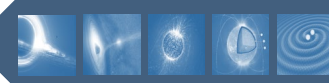




EXTP







Our **Czech Republic – Italy (+.....) collaboration** has been in place for >15 years and it has been very productive, enabling to reach a very solid scientific and technological maturity for a **game-changer** mission.

The collaboration is **still active**, on the scientific support and exploitation of the eXTP mission (launch 2030), welcome by the Chinese Academy of Sciences.

The concept of a large-area, spectral-timing mission remains compelling, with a wide and strong support by the European high energy astrophysics community. Other routes are being explored for a **future implementation**.

