CATCHING GRBs WITH LBAS

Thanks to its very large field of view, the Wide Field Monitor will discover >150 Gamma-ray Bursts (GRBs) per year. For these, as well as other impulsive high-energy events, trigger time and position will be transmitted to the ground within 30s by the on-board LOFT Burst Alert System (LBAS).

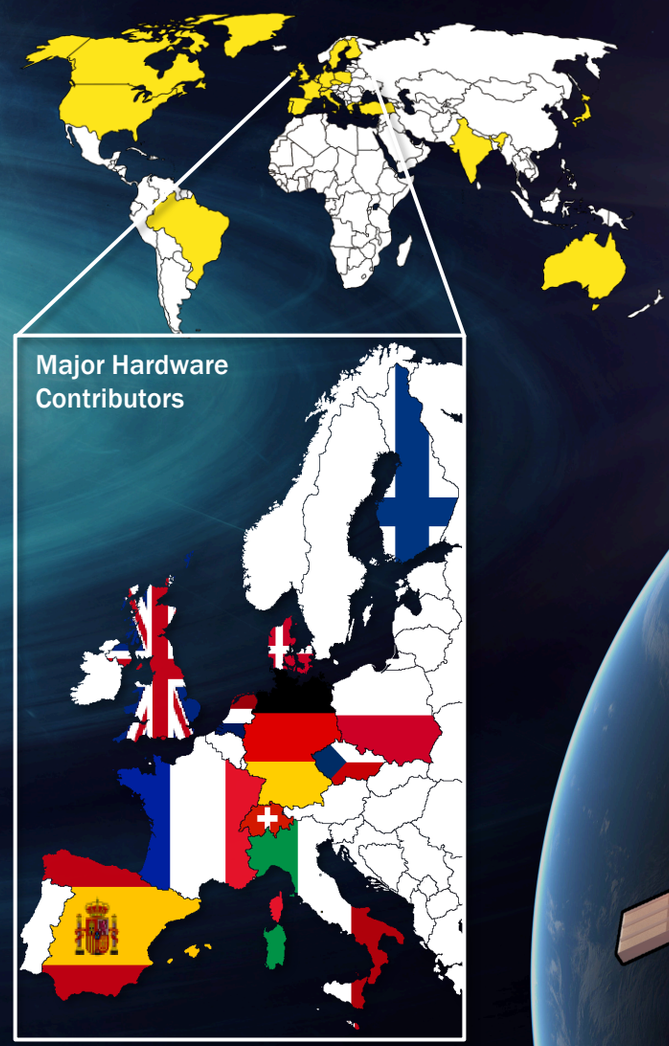
LOFT: A DISCOVERY MACHINE

The revolutionary solid-state design of the LOFT/LAD enables both its huge effective area (more than 15 times that of any previous X-ray mission) and its CCD-like energy resolution (so far only found in instruments with less than 1% its effective area), yielding a breakthrough in the study of the fast and violently variable X-ray Universe.

The unique combination of sensitivity, spectral resolution and field of view of the Wide Field Monitor makes LOFT a powerful discovery machine for the transient sky.

LOFT is a natural X-ray partner for other large-scale facilities across the "multi-messenger" spectrum that will be available in the 2020s (SKA, LSST, ELTs, CTA, ground and space-based gravitational wave interferometers and neutrino telescopes). Phenomena that will be monitored with LOFT in coordinated campaigns include flare stars, the spectral variability of magnetized white dwarfs and neutron stars, black holes, blazar outbursts, and tidal disruption events associated with supermassive black holes in galactic nuclei.

LOFT CONSORTIUM



Credits images:
gdefon.ru, wikipedia, K. Murano
renegadeastronomer.blogspot.ch
INAF, CSIC-IEEC, NASA, ESA, CXO

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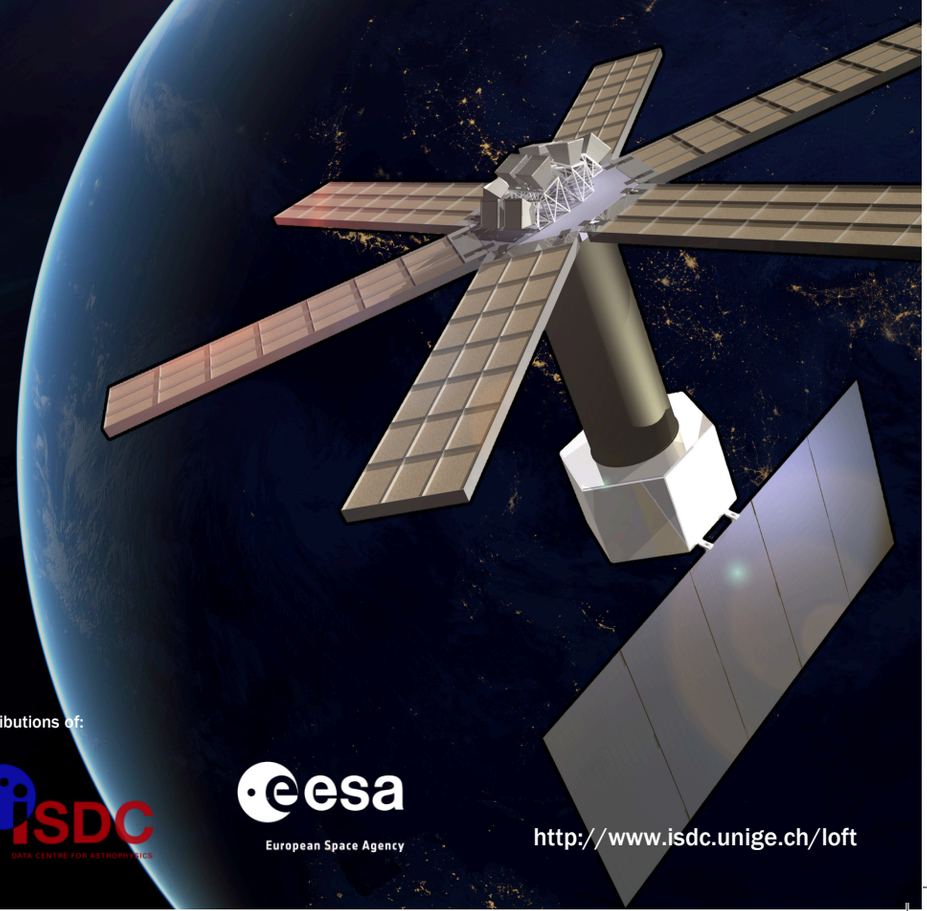
LOFT

LARGE OBSERVATORY FOR X-RAY TIMING

An ESA M3 mission candidate that will get closer than ever to black holes and neutron stars, probing the strongest curved space time in the Universe and answering the fundamental questions of the Cosmic Vision theme: "matter under extreme conditions".

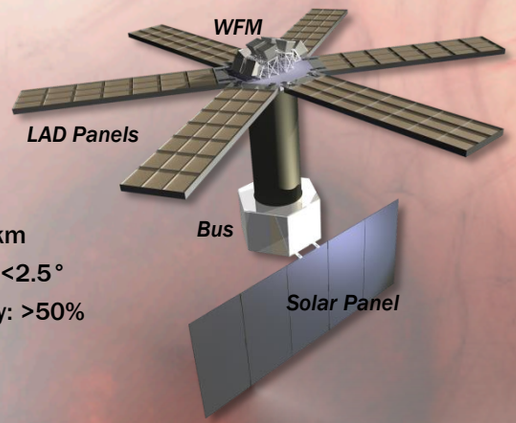
With its vast increase in collecting area with respect to any previously flown X-ray experiment and solid state-type spectral resolution, LOFT will measure the effects of general relativity in the strong field regime and determine the nature of matter at extremely high densities.



esa
European Space Agency

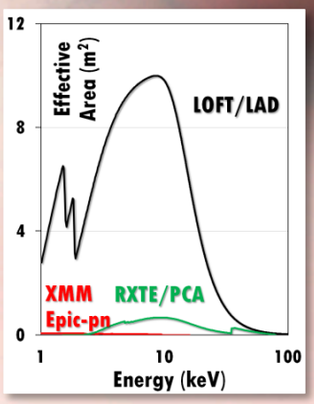
http://www.isdc.unige.ch/loft

LOFT: A MISSION DEVOTED TO X-RAY TIMING



- Orbit: 550 km
- Inclination: <2.5°
- Sky visibility: >50%

LOFT PAYLOAD

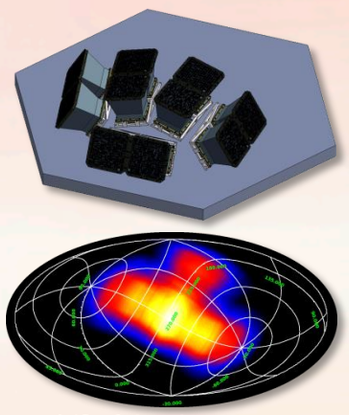


Large Area Detector (LAD):

- Collimated experiment
- 6 deployable panels
- 2016 Si Drift Detectors
- Energy range: 2-30 keV
- Peak A_{eff} = 10m² @ 8keV
- 240000 cts/s @ 1Crab
- ΔE < 260 eV @ 6keV (< 200 eV for ~45% events)
- time resolution: 10 μs

Wide Field Monitor (WFM):

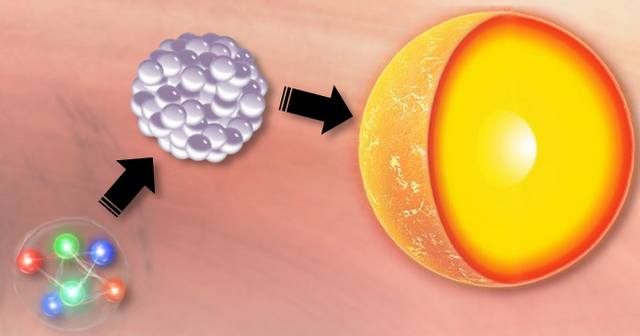
- 10 coded mask cameras
- Energy range: 2-50 keV
- Peak A_{eff} = 170 cm²
- ΔE < 350 eV @ 6 keV
- Time resolution 10 μs
- Source localization 1'
- Field Of View >1/3 sky (180°×90°+90°×90°)



>1/3 of the sky at once

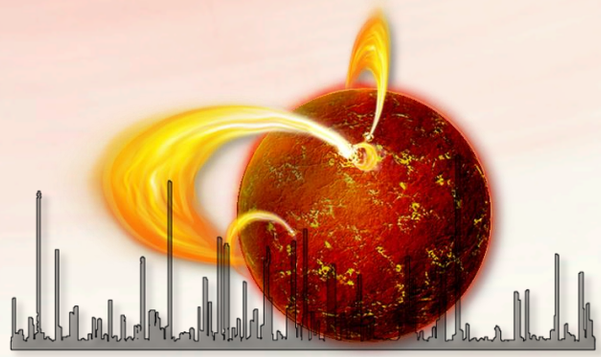
LOFT SCIENCE: SUPRA-NUCLEAR DENSITY MATTER

LOFT will measure the Equation of State of ultra-dense matter by determining neutron star masses and radii to unprecedented accuracies.



Employing several complementary techniques to phenomena such as relativistic light-bending and thermonuclear explosions, LOFT will determine the composition of neutron stars and reveal the nature of matter and nuclear forces at densities far beyond those that can be studied in terrestrial laboratories.

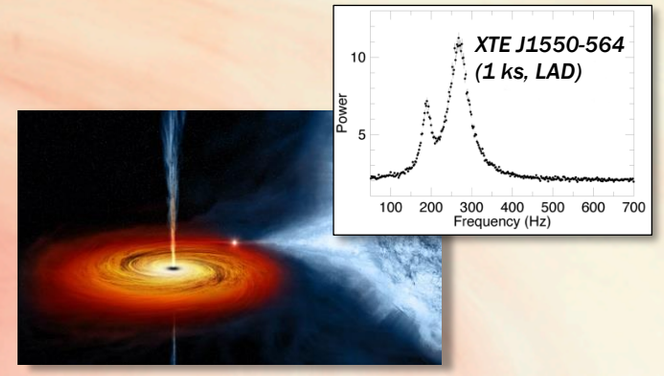
LOFT will also use asteroseismology to probe neutron star interiors.



By detecting vibrations excited by starquakes in the most strongly magnetized neutron stars ("magnetars") with unprecedented sensitivity, LOFT will determine the composition and structure of these extreme objects.

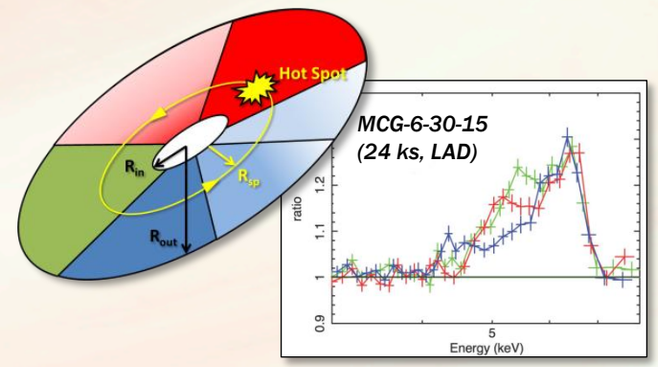
LOFT SCIENCE: STRONG FIELD GRAVITY

LOFT will probe General Relativity in the strong-field regime by measuring the motions of plasma where in our Universe gravity is strongest: tight orbits just outside black holes and neutron stars.



The fast X-ray variability of neutron stars and black holes measured by LOFT will reveal how the motion of material close to these objects is affected by their strong gravitational fields.

LOFT will measure black hole masses and spins through time variability and spectroscopic measurements.



The effective area and energy resolution of LOFT enable it to trace spectral variations of the Fe-K emission line produced by spots orbiting close to supermassive black holes, allowing their masses and spins to be measured.