

ASTENA mission concept: an Advanced Surveyor For Transient Events and Nuclear Astrophysics

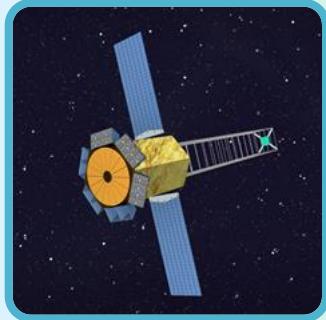
L. Ferro, F. Frontera, C. Guidorzi, A. Mazzolari, M. Moita, P. Rosati (University of Ferrara), N. Auricchio, R. Campana, E. Caroli, M. Orlandini, J. B. Stephen, E. Virgili, (INAF-OAS of Bologna), C. Ferrari (CNR-IMEM Parma), S. del Sordo, (INAF-IASF Palermo), E. Massa (INRIM Torino), F. D'Amato (CNR-INO, Sesto Fiorentino), F. Recchia (University of Padua), G. Bertuccio (PoliMI)

On behalf of a larger collaboration

ASTENA mission concept

Narrow Field Telescope (NFT, 50 – 700 keV, 30''
Angular Resolution, 4' FOV) + **Wide Field Monitor**

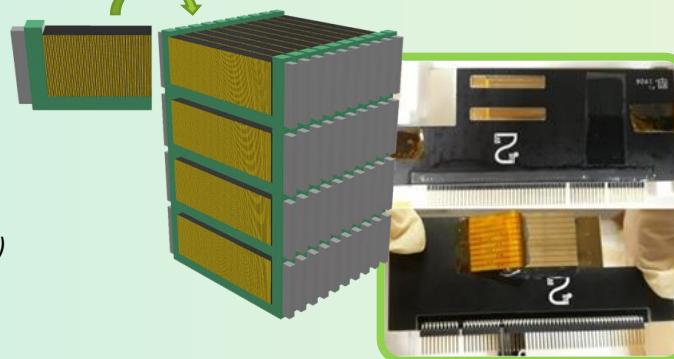
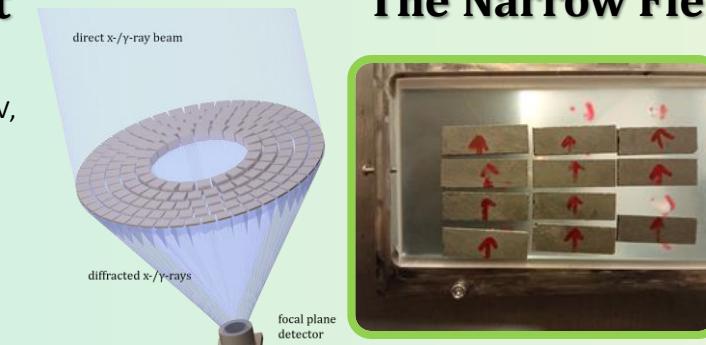
Imager and Spectrometer (WFM-IS, 2 keV – 20 MeV,
1' Point Source Localization Accuracy, 2 sr FOV)



Scientific Goals

1. Deep study of Gamma-Ray Bursts and other high energy transients.
2. Unprecedented study of nuclear astrophysics.
3. And more (x-ray binaries, magnetars, Active Galactic Nuclei, spectroscopy and polarization, etc.)

Submitted to ESA for its new long term program «Voyage 2050»



The Narrow Field Telescope

Focussing optics: Laue lens

- Based on Bragg's law of diffraction inside crystals, in transmission configuration
- Bent Si(111) and Ge(111) crystals.
- Focal length = 20 m

Focal plane detector

- Segmented CZT (higher efficiency) or HPGe (higher energy resolution).
- Cross section of $8 \times 8 \text{ cm}^2$, thickness of 8 cm.
- 3D spatial resolution of 0.3 mm
- High energy resolution (@511 keV, CZT: 1%; HPGe: 0.4%)

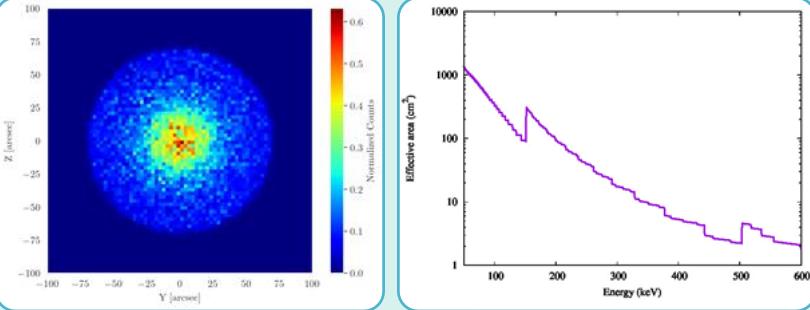
ASTENA mission concept: an Advanced Surveyor For Transient Events and Nuclear Astrophysics

L. Ferro, F. Frontera, C. Guidorzi, A. Mazzolari, M. Moita, P. Rosati (University of Ferrara), N. Auricchio, R. Campana, E. Caroli, M. Orlandini, J. B. Stephen, E. Virgili, (INAF-OAS of Bologna), C. Ferrari (CNR-IMEM Parma), S. del Sordo, (INAF-IASF Palermo), E. Massa (INRIM Torino), F. D'Amato (CNR-INO, Sesto Fiorentino), F. Recchia (University of Padua), G. Bertuccio (PoliMI)

On behalf of a larger collaboration

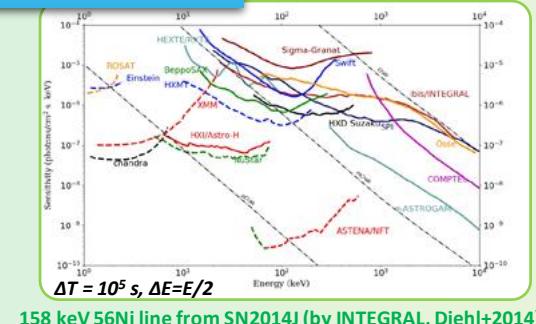
NFT performance evaluation

Point Spread Function (PSF) evaluated through ray-tracing. Effective area and focal plane detection efficiency evaluated through Monte Carlo simulations.

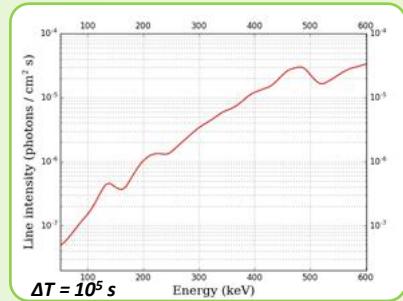
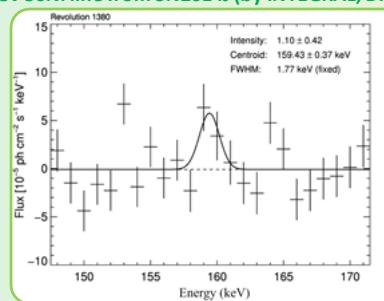
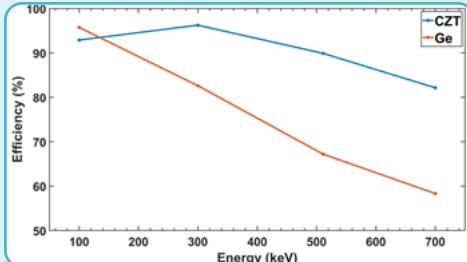


For the polarimetric capabilities, see poster by Moita et al.

Unprecedented continuum and line sensitivity!



158 keV 56Ni line from SN2014J (by INTEGRAL, Diehl+2014)



The same line, seen by NFT!

