X-RAY IMAGING AND SPECTROSCOPY MISSION (XRISM)

S [cour

Makoto S. Tashiro (ISAS/JAXA, Saitama University) on behalf of XRISM team



MISSON CONCEPT



- The high precision spectroscopy with imaging \leftarrow X-ray microcalorimeter
- The wide field of view imaging with the conventional X-ray CCD camera.

Instrument	FOV/pix	ΔE (FWHM @6 keV)	Energy band
Resolve (XMA + X-ray microcalorimeter)	2.9' □ / 6 x 6 pix	7 eV (goal 5 eV)	0.3 – 12 keV
Xtend (XMA + X-ray CCD)	38' □/ 1280 x 1280 pix	< 250 eV at EOL (< 200 eV at BOL)	0.4 – 13 keV



THE SPACECRAFT AND THE ORBIT

Mass	2.3 t
Dimension	7.9 m x 9.2 m x 3.1 m
Design life	3 years + cryogen free operation

- Orbit altitude = 575 +/- 15 km
- Inclination angle = 31 degree
- Orbital period = 96 min

SCIENCE OBJECTIVES

"Revealing material circulation and energy transfer in cosmic plasmas and elucidating evolution of cosmic structures and objects"

- How did the large structure formed?
 - What forms and sustain the clusters of galaxies structure against gravity 2
 - Gas pressure, turbulence, and their spatial distribution

 How were the elements and energy produced and distributed in the universe ?

- Metallicity of SNs and their remanants
- Dissipation of the material
 - Velocity of elements of SNR metals
 - and Accretion and outflow (winds) of AGNs, galaxies

New astrophysics with X-ray micro-calorimeter

XRISM FOR THE WORLD INTERNATIONAL COLLABORATION

- XRISM is a JAXA led joint mission with NASA
- ESA collaborates under agreement with JAXA
- NASA provides;
 - X-ray mirror assembly (Resolve, Xtend)
 - X-ray calorimeter detector assembly (Resolve)
 - Aperture assembly (Resolve)
 - ADR assembly (Resolve)
 - X-ray calorimeter amplifier and ADR electronics (Resolve)
- ESA provides;
 - Filter wheel mechanics and electronics (Resolve)
 - Loop heat pipe (Resolve)
 - Star trackers (Bus)
 - Magnetic torguers (Bus)
 - Geomagnetic Aspect Sensors (Bus)





X-Ray Imaging and

STATUS OF PROJECT





OBSERVATION PHASES





INITIAL PHASE

- Critical operation period (~ I week)
 - Launch S/C separation -SAP deployment -3 axis confroi
 - Start cooling system
 - Power/Thermal control, communication, attitude control
- Commissioning period (~3 months)
 - S/C bus system
 - Observation instruments
 - Ground data processing system
 - Parameter tunings (bus and mission instruments)





NOMINAL PHASE: CALIBRATION & PERFORMANCE VERIFICATION

- XRISM Science Team is responsible for PV observations[®]
 - Purpose
 - To verify the capability to fulfill the scientific goals
 - To showcase the XRISM transformational science
 - The data are reserved to the XRISM Science Team
 - The identified scientists directly contributing to develop E
 H/S/W or to manage XRISM science activity.

PV target list has been released...

https://xrism.isas.jaxa.jp/research/proposer/PVtargets/index.html

- XRISM Guest Scientists (XGS) will be added
 - 3 agencies will call for the XGS to add special expertise for each PV observation
 - Limited access to each observation data





NOMINAL PHASE: GUEST OBSERVATION PHASE

- XRISM is open to community after the PV phase
 - JAXA, NASA and ESA call for proposal and make selection independently according to the agreements
 - Each PI submits to his/her regional agency (JAXA, NASA, or ESA)

- ARK/RPS (proposal system) will be utilinzed.
- Announce of Opportunity (AO) 1 will be released just after the launch.



FOR THE NEW WORLD WITH XRISM





HEAPA symposium: XRISM (Makoto S. Tasł