High-lelvel data processing of JAXA's　scientific　satellites

● **Responsible Representative**

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● **Abstract**

Carry out high-level data processing of a large volume of the data from JAXA's scientific satellite

● **Reasons and benefits of using JAXA Supercomputer System**

JSS is effective for high-level processing of large-scale data acquired by scientific satellites　and large-scale simulations , as it requires high computational power and large-scale data storage.

● **Achievements of the Year**

We were able to perform observation simulations of the LiteBIRD satellite and investigate the optimal design. We verified the observational potential of XRISM and performed simulations to explain the initial observational data, and we were able to extract the maximum amount of scientific results from the XRISM data.

● **Publications**

- Peer-reviewed papers

"Detection of the orbital modulation of Fe Kα fluorescence emission in Centaurus X-3using the high-resolution spectrometer Resolve onboard XRISM", Mochizuki, Y., et al. , The Astrophysical Journal Letters, IOP Publishing, 977 L21, November 2024, DOI: 10.3847/2041-8213/ad946d

"Outflowing photoionized plasma in Circinus X-1 using the high-resolution X-ray spectrometer Resolve onboard XRISM and the radiative transfer code cloudy",

Tsujimoto, et al. , Publications of the Astronomical Society of Japan, 2025, in press

"New Insights with XRISM Cloudy: A Novel Column Density Diagnostics"

Chamani M. Gunasekera, Peter A. M. van Hoof, Masahiro Tsujimoto, Gary J. Ferland

Astronomy & Astrophysics, 694, L13

"Intrinsic line profiles for X-ray fluorescent lines in SKIRT"

Vander Mullen, B., Caps, P, Tsujimoto, M., Wada, K.

Astronomy & Astrophysics Letters, 688, L33

- Oral Presentations

Mochizuki, Y. et al. "Orbital & spin modulation of Fe emission lines in Cen X-3 using XRISM/Resolve", XRISM Science Team Meeting #6, Galactic Compact, Tokyo Metropolitan University, September・2024

Mochizuki, Y.," Cen X-3 target team, Status report (5) & Research talk in Cen X-3", XRISM Science Team Meeting #7, Galactic Compact, Arizona state University, February・2025

Nagano, Y. "HWP and systematics effects with asymmetric beams", CMP-INFLATE meeting, 2025/01/27-29@KEK

- Poster Presentations

Mochizuki, Y., et al. , "Orbital modulation of Fe spectral features in Centaurus X-3", XRISM Science Workshop for Young Researchers, #4, Tokyo Metropolitan University, September 2024

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	Automatic Parallelization
Number of Processes	1
Elapsed Time per Case	10 Hour(s)

- **JSS3 Resources Used**

Fraction of Usage in Total Resources[1](%): 0.38

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[2](%)
TOKI-SORA	88,625.24	0.00
TOKI-ST	2,994,062.87	3.07
TOKI-GP	42.28	0.00
TOKI-XM	444.49	0.22
TOKI-LM	33,282.41	2.40
TOKI-TST	0.09	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[2] (%)
/home	1,835.50	1.24
/data and /data2	250,533.00	1.20
/ssd	46,054.33	2.47

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[2] (%)
J-SPACE	17.00	0.06

[1]: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

[2]: Fraction of Usage：Percentage of usage relative to each resource used in one year.

● **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage[2] (%)
ISV Software Licenses (Total)	0.00	0.00

[2]: Fraction of Usage：Percentage of usage relative to each resource used in one year.