XRISM Key Program Call for Proposals

Overview

The XRISM Project invites proposals for the first XRISM **Key Program (KP)**, with observations planned to begin on **June 1st, 2027**. The KP is intended to establish the long-term scientific legacy of XRISM through strategically designed large observing programs that address fundamental scientific questions and produce benchmark datasets for the broader astronomical community.

Approximately **3 Ms of observing time**, corresponding to about **20–25% of the annual Guest Observer (GO) observing time**, will be allocated to the KP during the first year. The KP will be offered on an annual basis, and the observing time allocated to the KP is expected to increase gradually in future proposal cycles.

The XRISM Project, led by JAXA, invites proposals from the worldwide scientific community. All KP proposals will be evaluated by a single international Time Allocation Committee (TAC).

Proposal deadline:

23:59 UT on Thursday, December 3, 2026 (08:59 JST on Friday, December 4, 2026)

1. Scope of the Program

Background

XRISM was successfully launched on September 7, 2023 and has continued nominal science operations since then. Following the initial commissioning and performance verification phase, the mission entered the Guest Observer (GO) program in September 2024. XRISM is currently conducting its Cycle 3 Guest Observing Program. An overview of the XRISM mission and scientific operations is provided in **Appendix A**.

During its first years of scientific operation, XRISM has demonstrated the transformative capability of high-resolution X-ray spectroscopy, producing significant scientific results across a broad range of astrophysical topics, including the formation of large-scale structure, the co-evolution of galaxies and supermassive black holes, the chemical evolution of the Universe, and fundamental plasma physics. At the same time, these observations have revealed new scientific questions that require systematic follow-up observations.

Based on these early scientific achievements, the XRISM Project has defined a new set of Science Objectives to guide the mission during its extended phase:

- To establish the physical mechanisms governing energy transport and dissipation in the intracluster medium, thereby enabling a more accurate understanding of dark-matter-driven structure formation.
- To quantify the feedback impact of AGN-driven outflows on galaxy evolution across the diverse population of AGN.
- To utilize X-ray spectroscopic techniques for measuring fundamental quantities of supermassive black holes and astrophysical compact objects.
- To establish the physical structure and conditions of accretion flows and stellar winds in compact-object binaries, providing new insights into stellar evolution processes leading to double compact-object systems and supernovae.
- To provide novel quantitative constraints on nucleosynthesis in diverse astrophysical environments.
- To establish benchmark datasets that guide improvements in plasma modeling, atomic databases, and laboratory measurements, thereby contributing to advances in related fields beyond astrophysics.
- To exploit unique observational opportunities that cannot be reproduced in the future by utilizing high-resolution X-ray spectroscopy and wide-field X-ray imaging, in particular, but not limited to, multi-messenger astrophysics.

To efficiently address these objectives within the remaining operational lifetime of the mission, the XRISM Project will implement a Key Program (KP), consisting of strategically selected large observing programs designed to address the newly defined Science Objectives and maximize the scientific legacy of XRISM.

Key Program

The XRISM Project will introduce the KP beginning on June 1, 2027. Approximately 3 Ms of observing time per year, corresponding to about 20–25% of the annual Guest Observer (GO) observing time, will be allocated to strategically designed observing programs that maximize the long-term scientific legacy of XRISM.

The KP will be offered on an annual basis. The observing time allocated to the KP is expected to increase gradually in future proposal cycles. The KP will be solicited and reviewed independently of the regular GO program. The list of accepted KP programs will be announced approximately 1.5 months before the proposal deadline for the subsequent GO cycle so that GO proposers may take into account the approved KP observations.

The XRISM Project particularly welcomes proposals that address the Science Objectives described above, although proposals presenting compelling new scientific directions beyond these objectives are also encouraged.

Proposal Scope

Compared with the regular GO program, the KP provides substantially greater flexibility in the design of observing programs. For non-Target-of-Opportunity (non-ToO) proposals, **no upper limit is imposed on the requested observing time**. However, given the limited observing resources available, the Mission Steering Group of the XRISM Project reserves the right to approve only part of a proposed observing program. As in the GO program, the minimum duration of an individual observation is 10 ks, and the maximum number of spacecraft repointings is limited to 10 per week to reduce operational workload. Multi-year observing programs, such as long-term monitoring campaigns of individual targets, are permitted. For this first KP call, proposals may span **up to three years (from June 2027 to May 2030)**. Proposals must not request observations before June 1, 2027.

Principal Investigators of approved multi-year programs will be required to submit an annual progress report to the XRISM Mission Steering Group. Continuation of the program beyond each year will be subject to review based on scientific progress and the status of the program. The KP also accepts **adaptive observing programs**, in which the observing plan may be revised **on an annual basis** in response to scientific results obtained during the previous year. Specifically, investigators may request modifications to the targets, pointing positions, or observing strategies for the subsequent year based on the observations already completed, **provided that the total approved observing time remains unchanged**. Such proposals must clearly describe the decision criteria and specify how the observing program will be modified under different scientific outcomes. Any proposed modifications will be considered as part of the required annual progress review and will be implemented only after approval by the XRISM Mission Steering Group.

Proposal Contents

Each proposal should clearly describe:

- the scientific background and motivation;
- the scientific questions to be addressed;
- the relevance of the proposed program to the XRISM Science Objectives;
- the expected scientific outcomes;
- the observing strategy (triggering criteria for ToO proposals);
- the data analysis and publication plan;
- a detailed feasibility assessment.

For adaptive multi-year programs, the proposal must additionally describe the decision process for modifying future observations. If observations require specific scheduling constraints, these requirements should be fully justified and clearly documented.

Because the KP represents a major investment of XRISM observing resources, **feasibility is expected to be assessed in substantially greater detail than for regular GO proposals**. If the feasibility assessment is subsequently found to contain significant errors that materially affect the scientific feasibility of the proposed observations, the XRISM Mission Steering Group reserves the right to modify or cancel the approved observations, even after proposal acceptance. Proposals must also describe the team structure, the expertise and available resources of the proposing team, and, where applicable, any PI-led coordinated observations with other observatories, including the anticipated observing windows if known.

Evaluation Criteria

All KP proposals will be evaluated by a single international Time Allocation Committee (TAC). Reviewers are not allowed to propose for KP as a PI or co-I to prevent conflict of interest. The Final approval of and time allocation for selected KPs should be made by the XRISM Mission Steering Group.

Proposals will be evaluated based on:

- scientific merit;
- relevance to the XRISM Science Objectives;
- legacy value;
- clarity of the proposal;
- appropriateness of the observing strategy;
- credibility of the feasibility assessment;
- appropriateness of the data analysis and publication plan.

The review process will **not** be dual-anonymous as per JAXA's guidelines.

KP allocates a substantial fraction of the XRISM observing program; therefore, the review committee will explicitly consider whether the proposed data analysis and publication plan are sufficiently detailed, realistic, and appropriate to ensure that the scientific objectives of the program can be achieved and that its scientific legacy will be effectively delivered.

Unlike the regular GO program, KP proposals will not be assigned observing priorities (Priority A, B, or C). All approved KP observations will be treated as equivalent to Priority A observations. This means that an approved observation will be regarded as completed once at least 90% of the approved observing time has been successfully executed.

Target-of-Opportunity (ToO) proposals

In addition to non-ToO KPs, this KP Call also accepts proposals for strategically important ToO observing programs of rare astronomical events. They can be either celestial sources whose sky coordinates are known in advance and undergo a transient phenomenon, or astronomical events whose coordinates cannot be predicted in advance.

Eligible programs include, but are not limited to:

- transient phenomena with an annual trigger probability of **less than 10%**. If multiple candidate targets are included in a proposal, the combined probability that any target satisfies the triggering criteria within a given year must also remain below 10%;
- rare recurrent events, such as outbursts of long-period recurrent novae, that are expected to occur approximately once per decade or less frequently;
- scientifically important unpredictable transients, including supernovae and tidal disruption events, whose positions are unknown in advance and which require rapid follow-up observations triggered by alerts from other observatories.

In all cases, the proposed observations must exploit XRISM's unique capabilities, namely its **high-resolution X-ray spectroscopy and/or wide-field X-ray imaging**, and their sci scientific feasibility must be convincingly demonstrated. Similar to non-ToO KP proposals, a detailed feasibility assessment is required. The proposal must also clearly define the triggering criteria and the planned observing strategy following a trigger.

ToO proposals will be evaluated separately from the non-ToO KP proposals by **ToO Strategy Committees** appointed by the XRISM Project.

Approved ToO programs will remain valid **throughout the remaining lifetime of the XRISM mission**, eliminating the need for resubmission in subsequent proposal cycles. Observations triggered under this program will be executed using the **Director's discretionary observing time** and will therefore not count against the annual GO or KP observing time allocation.

To date, exceptionally rare transient events of the type targeted by the KP have been accommodated through the **Generic Target-of-Opportunity (Generic ToO)** program. The existing submission process for Generic ToO proposals will remain available. Investigators whose ToO proposals are not selected through the KP process are encouraged to submit proposals through the existing Generic ToO mechanism if scientifically compelling transient events arise during the mission.

Data Policy
All KP observation data (both non-ToO and ToO KPs) will be made **publicly available immediately** after standard pipeline processing. No proprietary period will be applied. Although the data will be openly available to the entire community, the XRISM Project strongly encourages researchers wishing to analyze KP data to contact the proposing team and pursue collaborative analysis and publication whenever appropriate.

Joint Programs
Joint observing programs with other observatories will **not** be offered in this first KP call. The XRISM Project will consider introducing such opportunities in future proposal cycles.

Contingency for Gate Valve Opening
If the Resolve gate valve is opened during the lifetime of the KP, the XRISM Mission Steering Group will review the overall KP in light of the substantially expanded scientific capabilities made available by the restored low-energy response. The implementation of the approved KP programs may therefore be reconsidered as appropriate.

2. Programmatic Information

The program is open to scientists from all over the world with no restriction on their affiliation. All KP proposals will be evaluated by a single international Time Allocation Committee (TAC). The final approval of and time allocation for selected KPs should be made by the XRISM Mission Steering Group.

Proposals shall be submitted electronically through the XRISM Remote Proposal Submission (RPS) system. The proposal must be written in English and prepared in PDF format. All page limits specified in this Call apply to the main text, figures, and tables unless otherwise stated.

Proposed observations must be planned to take place on or after **June 1, 2027** to be eligible for this KP Call. Requests for observations before this date will not be accepted.

The proposal shall consist of the following components.

- **Science Justification** (from *Scientific Background and Motivation* through *Data Analysis Plan*): **up to 6 pages**
- **Detailed Feasibility Assessment**: **no page limit**

- **Team Structure, Expertise, and Available Resources**: **no page limit**
- **References**: **no page limit**

Although no individual page limits are imposed on the sections indicated above, the complete proposal, including the Science Justification, must **not exceed 20 pages in total**. Detailed instructions for preparing each component of the proposal are provided in **Appendix B**. Proposals must be received through the RPS system by the deadline specified in this call. Late submissions cannot be accepted.

The abstracts of the selected proposals, together with the rationale for their selection, will be made publicly available.

Target List

All proposed targets or regions should be entered in the RPS proposal form. There is no limit on the number of targets or regions that may be entered.

For targets whose coordinates are unknown at the time of proposal submission (e.g., certain Target-of-Opportunity observations), applicants should enter

- RA = 0.0
- Dec = 0.0

in the RPS form.

Deadline

Proposals are due no later than 23:59 UT, Thursday, December 3, 2026
08:59 JST, Friday, December 4, 2026

Helpdesk

Should you have any questions regarding proposal preparation or submission, please contact the dedicated KP Helpdesk at <**xrism-help-key-program@ml.isas.jaxa.jp>.** The KP Helpdesk will operate only during the proposal solicitation period and will close shortly after the proposal deadline. Questions related to approved observations and mission operations should thereafter be directed to the regular XRISM Helpdesks operated by JAXA, NASA, or ESA, as appropriate.

Appendix A: XRISM Mission and Scientific Operations

A.1 XRISM Mission Overview

XRISM (X-Ray Imaging and Spectroscopy Mission) is the seventh Japanese X-ray astronomy satellite, developed by JAXA in collaboration with NASA and ESA. The XRISM scientific payload consists of two co-aligned instruments: the Resolve X-ray microcalorimeter spectrometer and the Xtend X-ray CCD imager. The instruments are located at the focal planes of two X-ray Mirror Assemblies (XMAs), lightweight foil telescopes similar in design to those flown on ASCA and Suzaku, but with an improved half-power diameter of approximately 1.3 arcmin.

Resolve employs a cryogenically cooled 6×6 microcalorimeter array covering a field of view of 3×3 arcmin^2, with a spectral resolution of approximately 4.5 eV over the currently accessible 1.7–12 keV energy band. This capability provides the highest spectral resolution yet achieved above 3 keV for observations of celestial sources outside the Solar System. Unlike dispersive spectrometers, Resolve can observe spatially extended X-ray sources while maintaining the same spectral resolution across its field of view.

Xtend, located at the focus of the second XMA, provides a wide field of view of 38.5×38.5 arcmin^2 over the 0.4–13 keV energy range, with a spectral resolution of approximately 180 eV at 6 keV. The Xtend detector also provides a low and stable instrumental background across its entire field of view.

Resolve was designed to operate over the 0.3–12 keV energy band. However, while the Resolve gate valve remains closed, the instrument has little sensitivity below approximately 1.7 keV and a reduced effective area at higher energies. Proposers should prepare their observing programs using the instrument configuration and performance information available at the time of proposal submission. Relevant response files and technical information are provided on the XRISM website:
https://xrism.isas.jaxa.jp/research/proposer/index.html

Further information on the mission, instruments, software, and calibration products is available from the NASA XRISM Science website:
https://heasarc.gsfc.nasa.gov/docs/xrism/index.html

A.2 Scientific Operations

XRISM has a mass of approximately 2,300 kg and was launched from the Tanegashima Space Center in Japan on 7 September 2023 aboard a JAXA H-IIA launch vehicle. The spacecraft was placed into an approximately circular low-Earth orbit with an inclination of about 31

degrees and an initial altitude of approximately 575 km, which has now decreased to approximately 530 km.

XRISM operations are managed by scientists and engineers at ISAS/JAXA. The operations team is responsible for scheduling observations, commanding and controlling the spacecraft, collecting telemetry, and monitoring the health and status of the spacecraft and its scientific instruments. Before an approved observation is conducted, the operations team may contact the Principal Investigator to coordinate details of the observing plan.

Spacecraft operations are conducted from the Uchinoura Space Center in Japan. The onboard data recorder has a capacity of 12 Gbit, and telemetry is downlinked during ground-station contacts. The data are then transferred to ISAS/JAXA, where preprocessing is performed, including conversion to FITS format and generation of orbit and attitude files. The preprocessed science data are subsequently transferred to the processing pipeline at NASA's Goddard Space Flight Center, where the appropriate calibration information is applied.

The processed data are deposited in the XRISM mission archives maintained by ISAS/JAXA and NASA. All data obtained through the Key Program will be made publicly available immediately after completion of standard pipeline processing. No proprietary period will be applied.

Appendix B. Proposal Preparation Guidelines

The following provides detailed guidance on the content expected in each component of a Key Program proposal. The subsection structure given below is recommended, and proposers are strongly encouraged to follow it where appropriate so that proposals can be evaluated consistently and efficiently.

B.1 Science Justification (up to 6 pages)

B.1.1 Scientific Background and Motivation

Describe the scientific background and motivation for the proposed Key Program, including pertinent references and previous work. Clearly identify the fundamental astrophysical problem to be addressed and explain why it is important.

B.1.2 Scientific Questions and Objectives

State the specific scientific questions to be addressed and the objectives of the proposed program. Explain what will be learned from the proposed observations and how the program will advance the field.

B.1.3 Relevance to the XRISM Science Objectives and Legacy Value

Describe the relevance of the proposed program to one or more of the XRISM Science Objectives. Proposals addressing compelling scientific directions beyond the listed Science Objectives should explain why the program is particularly suitable for a Key Program.

Describe the expected long-term legacy value of the observations, including their potential to provide benchmark datasets or other lasting scientific value to the broader astronomical community. Explain how the program exploits the unique capabilities of XRISM.

B.1.4 Expected Scientific Outcomes

Describe the principal scientific outcomes expected from the program and how they will address the scientific questions and objectives stated above.

B.1.5 Observing Strategy

Describe and justify the overall observing strategy, including the requested observing time, target selection, pointing strategy, cadence, and any scheduling constraints relevant to the scientific objectives.

For multi-year programs, describe the distribution of observations over the requested years. For adaptive programs, clearly describe the decision criteria and how targets, pointing

positions, or observing strategies may be modified in response to results obtained in earlier observations. For Target-of-Opportunity proposals, clearly define the triggering criteria and the planned observing strategy following a trigger.

B.1.6 Data Analysis and Publication Plan

Describe the planned data analysis and publication strategy. Explain how the proposed analysis will achieve the scientific objectives of the program and how the team will ensure timely scientific return and effective delivery of the program's scientific legacy. Take into account that all Key Program data will be made publicly available immediately after standard pipeline processing.

B.2 Detailed Feasibility Assessment (no page limit)

Provide a detailed quantitative assessment demonstrating that the proposed observations can achieve the stated scientific objectives. As appropriate, include expected source properties and count rates, simulations, signal-to-noise estimates, background estimates, instrumental and calibration limitations, systematic uncertainties, and other information needed to establish feasibility.

Justify the requested exposure time for each target or class of targets and demonstrate that the proposed measurements will provide the required statistical and systematic precision. If specific scheduling or operational constraints are required, demonstrate their necessity and feasibility.

For Target-of-Opportunity proposals, assess the feasibility of the triggering criteria and observing strategy, including the expected event rate or trigger probability where applicable.

B.3 Team Structure, Expertise, and Available Resources (no page limit)

B.3.1 Team Structure and Roles

Describe the structure of the proposing team and the roles and responsibilities of key team members. Explain how the team will organize and coordinate the scientific analysis and publication activities required to carry out the program.

B.3.2 Expertise and Available Resources

Describe the expertise, experience, personnel, software, computational resources, and other capabilities available to the team that are relevant to the successful completion of the proposed program.

Where applicable, describe PI-led coordinated observations with other observatories, including anticipated observing windows if known.

B.3.3 Previous Use of XRISM Data

Briefly describe the team's experience in analyzing XRISM data relevant to the proposed program, including progress and scientific results from previous XRISM observations where applicable. If relevant, provide proposal or observation identifiers and the associated PI and program title.

B.3.4 Most Relevant Publications

List the publications by members of the proposing team that are most relevant to the subject of this proposal, particularly publications demonstrating expertise directly relevant to the proposed XRISM observations, data analysis, or scientific objectives.

B.4 References (no page limit)

Provide the references.

Although no individual page limits are imposed on Sections B.2, B.3, and B.4, the complete proposal, including the Science Justification, **must not exceed 20 pages in total**.