



Roman Subaru Synergistic Observations Program

Prioritized Themes for the Roman-Subaru Synergistic Observations

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Steering Group of Roman-Subaru Synergistic Observations



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1. Roman Subaru Synergistic Observations

JAXA and NASA have agreed on Japanese participation as an international partner to the Nancy Grace Roman Space Telescope mission project. One of the key areas of the collaboration is conducting Subaru-Roman Synergistic Observations, in cooperation with the Subaru Telescope and the National Astronomical Observatory of Japan.

Subaru-Roman Synergistic observations will bring great scientific benefits in astronomy since the two facilities have complementary powerful wide-field and high-contrast capabilities. While the two facilities are very powerful by themselves, the combination of the complementary data will bring new insights. Based on the support of the Subaru science community, Subaru Telescope reserves 100 nights during or reasonably after the Roman nominal mission period of 5.3 years after the launch.

2. Coordination Based on the White Papers

The coordination of the program for the 100 nights is led by a Steering Group (SG) who are designated by the JAXA and NASA Roman science leads. We expect the 100 nights will not be filled by many small programs that can be conducted by the Normal Programs of Subaru Open Use but assigned for a few large programs along the Themes identified by the Steering Group using community White Papers as input. Thanks to the efforts by the community researchers, the SG received 7 White Papers by 2025 March; the papers were based on discussions and coordination through a series of Roman-Subaru Workshops. The SG carefully reviewed the White Papers, both by the internal reviews as well as on-line interviews and e-mail communications with some of the White Paper authors.

The list of the Whitepapers is shown in Table 1.



Table 1 List of the submitted White Papers and Assigned In-Guide Number of Nights

ID	Title	Corresponding Authors	Proposed Subaru Instruments	In-Guide Number of Nights
1	Advancing Supernova Ia Cosmology and Time Domain Studies	Nao Suzuki	HSC, PFS	40
2	Roman-Subaru/HSC Concurrent Observations for Rogue Planet Mass Measurements	Daisuke Suzuki	HSC	20
3	The Subaru-PFS/Roman (SuPR) Deep Survey: Redshifts for Roman Cosmology	Brett Andrews, Jeff Newman	PFS	40
4	Roman/Subaru Synergistic Follow-up of RAPID-discovered transients	Schuyler D. Van Dyk	PFS	-
5	Subaru PFS/NINJA Roman Investigation of Neutral-hydrogen and Galaxies (SPRING)	Y Harikane , S Malhotra	PFS, NINJA	-
6	The Exciting Opportunity of Subaru High-Contrast Observations for the Roman Coronagraphic Mission	M.Kuzuhara	CHARIS, REACH, SCEXAO	-
7	Dark Matter on small scales: Precise dynamical analysis of dwarf spheroidal galaxies with Roman and Subaru-PFS	Kohei Hayashi	(PFS), PFS	-



3. Prioritized Themes for the 100 nights.

The SG is happy to announce the following three prioritized themes. We also show the ‘in-guide’ number of the nights to be allocated (among the total of 100 nights) for each theme. The in-guide numbers of the nights are given based on the proposed nominal/minimum observation time in the White Papers and the portfolio discussed in the SG review. The prioritized themes are those numbered ID1, ID2, ID3 in Table 1 of submitted white papers. However, we anticipate that the programs described in white papers ID4, ID5, and ID7 can be carried out in part by using available fibers in the observations for programs ID1-ID3. The observations needed for white paper 6 are distinct, but these can be proposed (and in some cases are already being carried out) as separate Subaru programs.

[1] Advancing Supernova Ia Cosmology and Time Domain Studies

(in-guide 40 nights, at the Roman northern High Latitude Time Domain Survey (HLTDS) fields)

It is essential to obtain the redshifts of live SNIa and host-galaxy via Subaru PFS spectroscopic observations to achieve the target precision in measuring cosmological parameters. The combination of the Subaru PFS and Roman HLTDS provides the desired efficiency for the purpose.

[2] Roman-Subaru/HSC Concurrent Observations for Rogue Planet Mass Measurements

(in-guide 20 nights, at the Roman Galactic Bulge Time Domain Survey (GBTDS) fields)

Coordinated HSC observations with GBTDS can provide unique opportunity to identify and to measure the mass of rogue planets. The program can make use of the bright/grey moon phase that is not suitable for some other programs.

[3] The Subaru-PFS/Roman Deep Survey: Redshifts for Roman Cosmology

(in guide 40 nights, at the Roman High latitude Wide Area Survey (HLWAS) equatorial Deep Survey fields)

Photometric calibration of faint galaxies is essential to achieve the target precision in the weak-lensing cosmology measurement. The allocated PFS observations are expected to focus the faintest targets whose redshifts are difficult to be measure by other facilities.



4. Next Step: pathway to develop the Subaru proposals

The SG now asks the community to submit proposals for the three prioritized themes. The call for Proposals will be announced in March, 2026.

- Call for proposal is open to the Japanese community as follows the Subaru Open Use policy, and the US Roman Community Forum members and not restricted to the authors of the White Papers.
- The ‘proposal’ describes the more detailed observation plans for the ‘in-guide’ case of the total number of nights (or the equivalent observation time, see the next section). The proposal should also give the plan for the ‘over-guide’ and ‘under-guide’ cases.
 - Over-Guide means In-Guide + 10 nights observation time.
 - Under-Guide means In-Guide – 10 nights observation time.
 - In the case of the Rogue Planets theme, Over/Under-Guide means +/- 5 nights of observation time.

For the PFS observations, either classical (i.e., non-queue, observers on site) or queue time allocation can be considered. For the classical allocation, 1 night is equivalent to 10 hours, and for queue allocation, 1 night is equivalent to 7 hours, including the overhead, since there is less weather loss for queue mode. The program may specify the fiber hours, but the equivalent number of the hours and nights should be given also in such cases.

- The availability of the dark sky conditions with ignorable moon glow depends on the Subaru Open Use time allocation in each semester. The nominal guide given here for HSC and PFS deep observations is to assume the condition with the moon-glow in a night of lunae phase near 0.5. Namely, maximum half of the total observation time is executed in “moon-less” condition, and the other half with the “moon-light” with the phase 0.5 with the reasonable separation from the targets. Justification should be provided if darker conditions are required.
- The SG strongly encourages community efforts to build one coordinated proposal for each theme. This proposal should include any observations that will use available fibers to address science goals beyond those of the primary theme, in particular to address the goals of the submitted white papers ID4, ID5, and ID7.
- If more than one proposal is submitted for one theme, the SG will review and select one.
- The SG also encourages the coordination with the other themes than the three prioritized ones for the PFS observations to maximize the science outputs for Roman-Subaru synergy.



5. Expected proposal format.

The proposals shall contain,

- a. PI/Co-PIs
- b. Team members
- c. Scientific Justification (less than 5 pages). This should include the expected scientific contribution of the in-guide program and what would be gained or lost from implementing the over-guide or under-guide program.
- d. Strategy and Plan of the Subaru observations for the in-guide, as well as the over-guide and under-guide observation time.
- e. Required or preferred sky conditions, including the seeing size threshold, sky background darkness (luna phase), photometric/non-photometric.
- f. Plan for data reduction

The expected due date of the proposals is planned in May/June 2026.

6. Further steps.

The submitted proposals will be reviewed by the SG to be iterated with advice from Subaru Telescope for the constraint of time allocation including the instrument capability and availability. The revised proposal will then be merged to the one Roman-Subaru proposal by the SG to be submitted to the Subaru Advisory Committee.