Status of Nobeyama Observations

Nishimura, Atsushi (Nobeyama Radio Observatory)



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- Charged telescope time system has been started.
 - No science reviews
 - Three deadlines
- Totally 47 proposals with 3070 hours requests were received.
 - Thank you very much for your cooperation!
 - The income corresponds to ~30% of the operating cost.

Deadline	Obs. Period	Title	Number of	Requested	Allocated	(Allocation	NRO
			Reeceived	Obs. Time	Obs. Time	for foreign	income
			Proposals	[h]	[h]	institute [h])	[M JPY]
1-Jun	1 Sep - 31 Oct	Development programs	4	389	360	0	3.96
		Hnads-on tutorials	3	54	54	0	0.59
1-Aug	1 Nov - 30 Apr	General programs	31	2461	2429	158	30.20
		EAVN observations	3	36	36	0	0.00
		Student programs	3	54	28	0	0.00
1-Dec	1 Feb - 30 Apr	General programs	3	76	76	0	0.84
		EAVN observations	0	0	0	0	0.00
		Total	47	3070	2983	158	35.585





Requested Time





PI Affiliations



Proposal Category

Season 2021 Season 2022 12 toposals 8 # Category Category

Cosmology and the high redshift universe
Galaxies and galactic nuclei
ISM, star formation and astrochemistry
Circumstellar disks, exoplanets and the solar system
Stellar evolution and the Sun

Acceptance Ratio



1.1. Student Time (Free-of-Charge)

- Student Time (free-of-charge):
 - Up to 100 hours (24 hours * 4 days)
 - Scientifically reviewed by some of JSAC members
- Reviewer (2022)
 - Kotaro Kohno (U Tokyo), Munetake Momose (Ibaraki U), Toshikazu Onishi (Osaka Metropolitan U), Hideo Sagawa (Kyoto Sangyo U), Kengo Tachihara (Nagoya U)
- Timeline
 - Deadline: 1 Aug
 - Review (online): mid-Sep
 - (We did not receive submissions on 1 Dec deadline.)
- Statistics 2022
 - Received: 3 proposals, 54 hours
 - Accepted: 2 proposals, 28 hours
 - All proposals were requesting the galactic center time.

Bold-font : Available instruments Light-font : Under development

- <u>Optics/Frontend</u>
 - Rx: H22, H40, Z45, FOREST, eQ, 7BEE
 - Hinotori Filter: **H22/H40**, H22/Z45, H22/H40/TZ
 - T70 was decommissioned
 - H22 was upgraded by Nakai-san (Kwansei-gakuin U) : T_{RX} 60 K \rightarrow 6 K
- <u>Backend</u>
 - SAM45 (problems reported by Tatematsu-san), Continuum BE, VLBI BE, RF SoC Spectrometer
- <u>Troubles</u>
 - Hydrogen maser problem
 - Antenna back-structure repair
 - Tiltmeter problem

• T70 decommissioning

- Malfunctions of SIS mixers and CLNAs were found during CSV on Oct.
- Accepted observations have been changed to use FOREST with an additional observation time corresponding to Tsys difference.

• <u>SAM45</u>

- Sometimes it could not be recovered from error by the standard procedure.
- Observations encountered this situation were rescheduled.
- We fixed a bug in clearSAM command (8 Dec) (Tatematsu-san's report).
- Now, SAM45 recovers from error by the standard procedure, whereas it sometimes takes long time (1-2 hours).
- Please report your time-loss to the daily observation report.

• Hydrogen maser clock problem

- DC supply module was broken (11 Nov).
- We must repair it. But the clock is made in Russia, and therefore we do not have prospect to repair it at this moment.
- NAOJ-Mizusawa and VLBI Consortium are considering alternatives.
- All VLBI observations using Nobeyama 45-m telescope were canceled.
- This problem does not affect single dish observations.

• Antenna back-structure repair

• Crack was found and repaired (Jun 2022).





• <u>Tiltmeter malfunction</u>

- Tiltmeter used for pointing correction installed on the master collimator infrequently shows irregular drift (~5-10 arcsec/h for worst case).
- When the drift occurs, the alert of earthquake will appear.
- In that case, please check the seismic intensity (震度) from the website of Japan Meterological Agency (気象庁).
- If no earthquake are reported, you can continue your observations, but you should pay attention to the pointing observation results, and you may check the pointing more frequently.

2.1. Observation Statistics (2021-2022)



2.1. Observation Statistics (2021-2022)



3. Development Activities

• Ongoing development projects:

- 7BEE (Tatematsu+): preparing for acceptance review
- HINOTORI (Imai, Niinuma+): ready to take acceptance review (H22/Z45 and H22/H40/TZ mode)
- eQ (Nakamura, Chiong+): CSV activities are almost complete
- MAO, FMLO, Tsukuba-CAM: development ongoing
- <u>Acceptance review</u>
 - Reviewed by NRO staff
 - Performance and operation strategy are mainly checked
 - After passing the acceptance review, the instruments will be a facility instrument that is operated and maintained by NRO with cooperation of development PIs.
- <u>Call for new development projects (draft)</u>
 - NRO is considering to restart development proposal program.
 - No scientific review, only technical review by NRO staff.
 - PI must prepare all budget including development and operation costs.
 - No acceptance review.

3.1. Progress on 7BEE

2022/8/2 Installation

Laser alignment







Development of wide-band lens (Yamasaki+ PASJ submitted)

Output : 7-Beam, 2-Pol., 3-Band



First light (2022/9/3)



3.1. Progress on 7BEE







, 3-Band



First light (2022/9/3)



3.1. Progress on 7BEE



4. Publication & Outreach

- Publications using NRO45m (Dec 2021 Nov 2022):
 - 27 refereed papers (ApJ/ApJL/ApJS: 15, PASJ: 5, MNRAS: 5, A&A: 1, AJ: 1)
 - 3 SPIE proceedings

• <u>NRO News Release</u>

- 4 releases (Dec 2021 Nov 2022)
 - 2021-12-14 : Tatematsu et al. "「もうすぐ星が生まれる場所」を含む野辺山電波地図の完成"
 - 2022-03-02 : Miyawaki et al. "重い星の誕生のようす, また一歩解明!"
 - 2022-03-10 : Murase et al. "KAGONMAプロジェクト: 星の誕生が分子雲に与える影響範囲を知る"
 - 2022-03-29 : Kohno et al. "天の川銀河の腕間にて巨大フィラメント状ガス雲を発見、そして星団形成の起源を…"
- NRO wants to release more observation results.
- Please let us know when your research is published.

4. Publication & Outreach

- Nobeyama Open Day (28 Aug 2022):
 - Held only online due to the COVID-19 situation.
 - Online public lecture
 - 7 speakers (Tatematsu, Shimoikura, K. Taniguchi, Imai, Amada, Tachihara, Burns)
 - Broadcasted through youtube and niconico-live
 - 84.4 k views
 - Virtual poster session
 - 28 posters
 - 150-300 visitors

• NRO Open Day 2023

- 22 Jul : On-line day
- 26 Aug : On-site day















Conclusion

- Operation system of NRO is drastically changing
- Scientific/Technical importance of NRO is still high
- I want to continue operation of Nobeyama 45-m by increasing its value
- Your contribution is essential
- If you notice any issues (machine troubles, insufficient manuals, requests to improve, opinion to the new system, etc...), please tell us
 - through helpdesk: <u>https://www.nro.nao.ac.jp/~nro45mrt/html/helpdesk/inquiry_form.html</u> (日本語OK)
 - or mail: atsushi.nishimura@nao.ac.jp