Report from Okayama Branch

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(Subaru Telescope Okayama Branch, NAOJ)

Subaru UM FY2025
Oct 29, 2025

Overview

Okayama Branch hosts the largest collection of optical/IR telescopes in Japan, including 3.8-m Seimei Telescope (Kyoto Univ.), and 188-cm telescope etc.
It is also a valuable observation site in East Asian region.

3 researchers + 2 admin. staffs (+8 reseachers for Seimei [Kyoto univ.])

Advantage

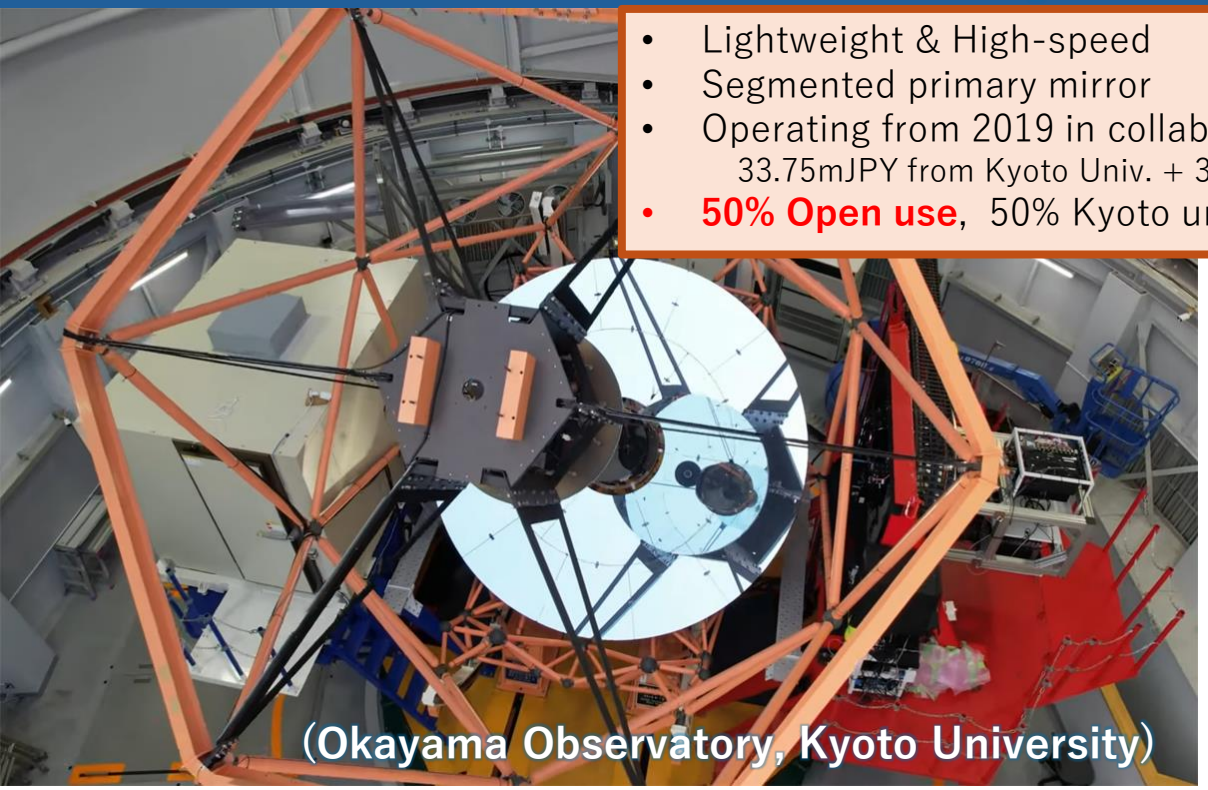
- Abundant observation time
  ○188cm, △Seimei
- Location
  Domestic access, Longitude on earth
- Optimization for ToO (○Seimei)
  Fast telescope, Quick instrument change

Main science **Time-domain astronomy**

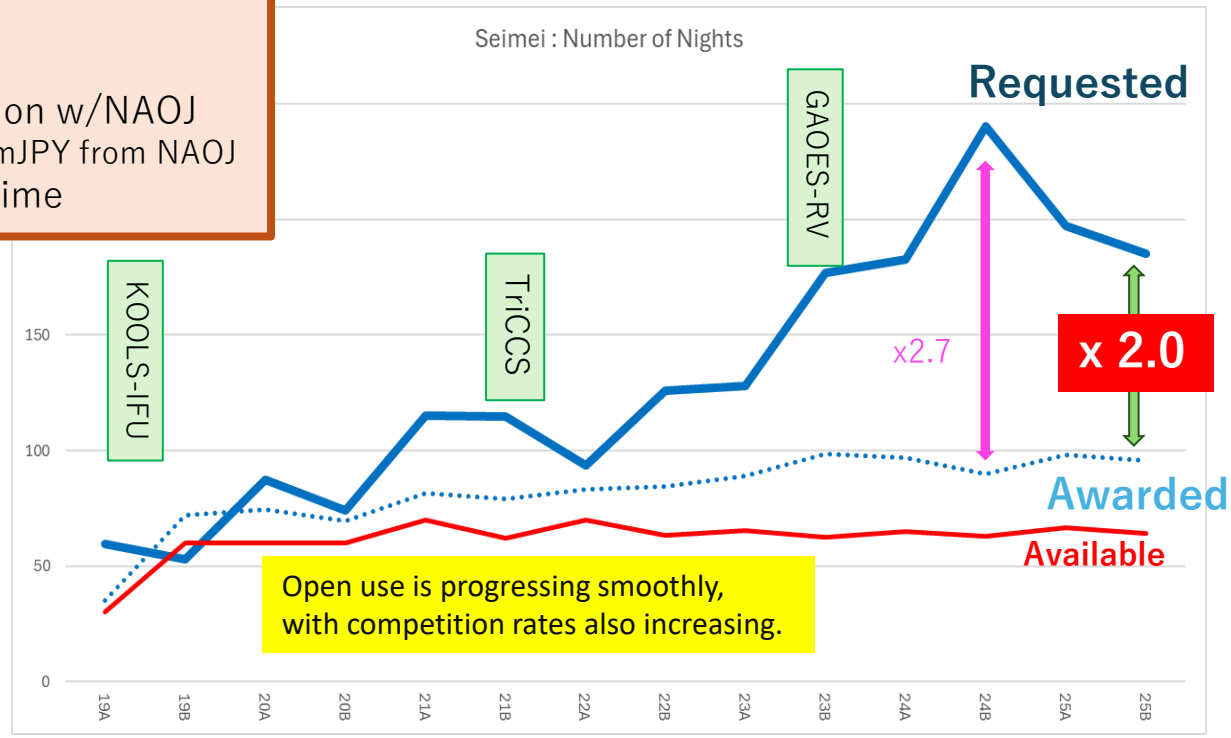
- Rapid response obs. of transient events
- High-cadence and long-term monitoring
  exoplanets
  various explosive events….

3.8-m SEIMEI Telescope

KYOTO UNIVERSITY + 国立天文台 NAOJ



- Lightweight & High-speed
- Segmented primary mirror
- Operating from 2019 in collaboration w/NAOJ
  33.75mJPY from Kyoto Univ. + 33.75mJPY from NAOJ
- **50% Open use**, 50% Kyoto univ. time



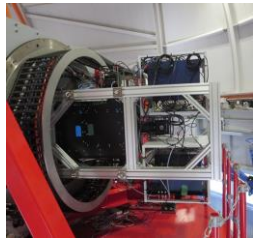
- **Full remote obs.** (since Jan. 2024) : utilization ratio >50%
- Queue & Automatic triggered ToO are under testing.

KOOLS-IFU

Optical Low-dispersion Spectrograph with Integral Field Unit

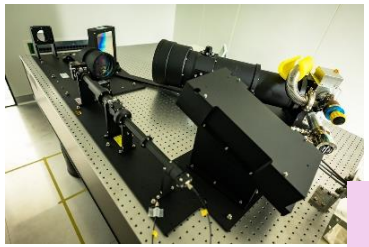
TriCCS

High-speed Tricolor CMOS Camera and Spectrograph



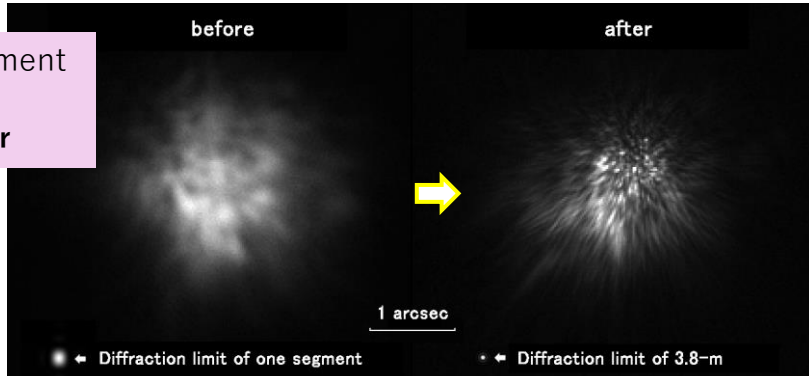
GAOES-RV

High-dispersion Echelle Spectrograph for RV measurement



Changes to each instrument can be completed within a minute.

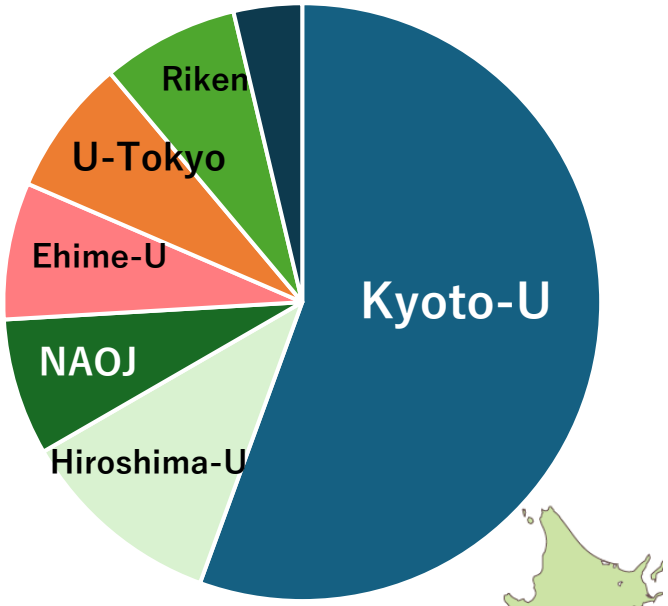
Succeeded for co-phase adjustment to get speckle image (2024.7)
→ **AO w/segmented mirror**

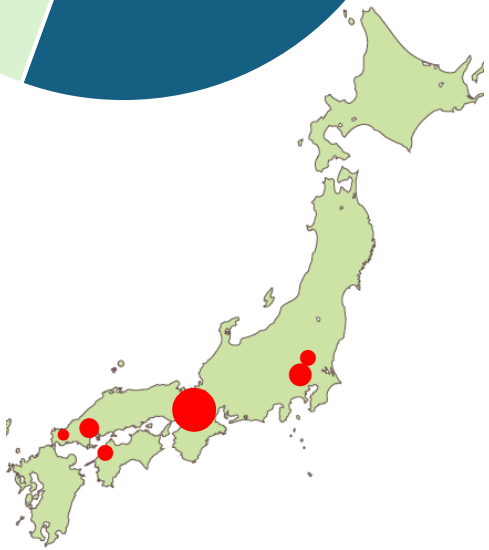


Hα +CaII HK module for GAOES-RV (MIDDSAR) is now under development.

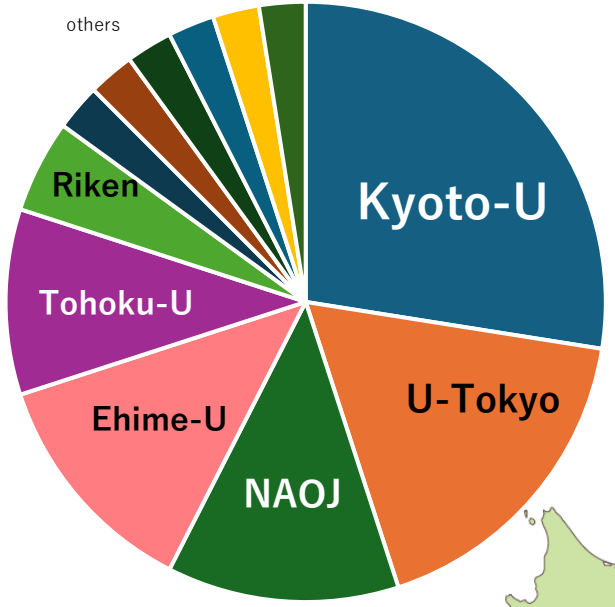
SEIMEI open-use : PI's Institutes

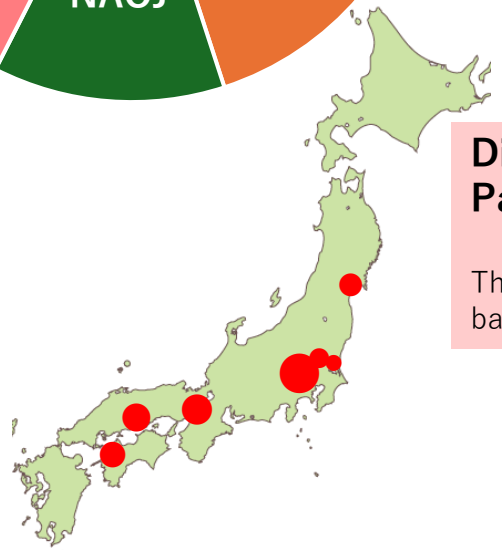
2019A-B



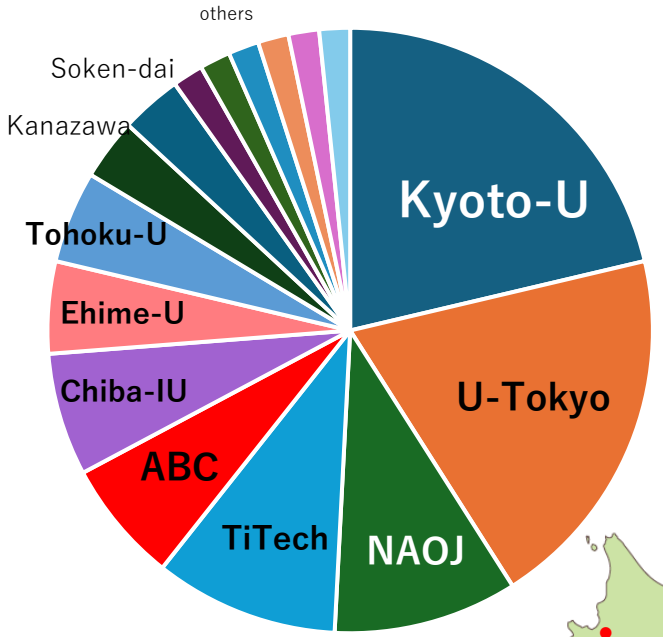


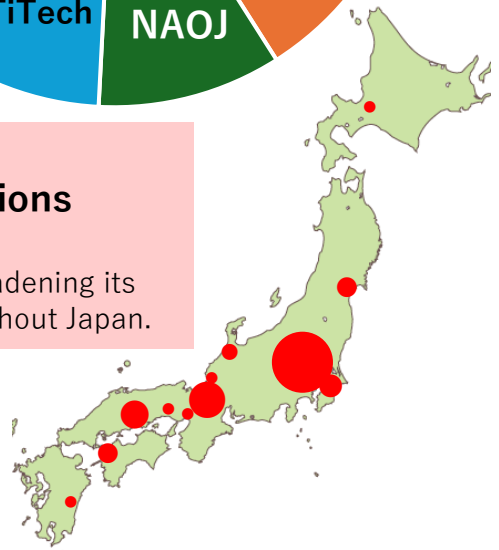
2022A-B





2024A-B

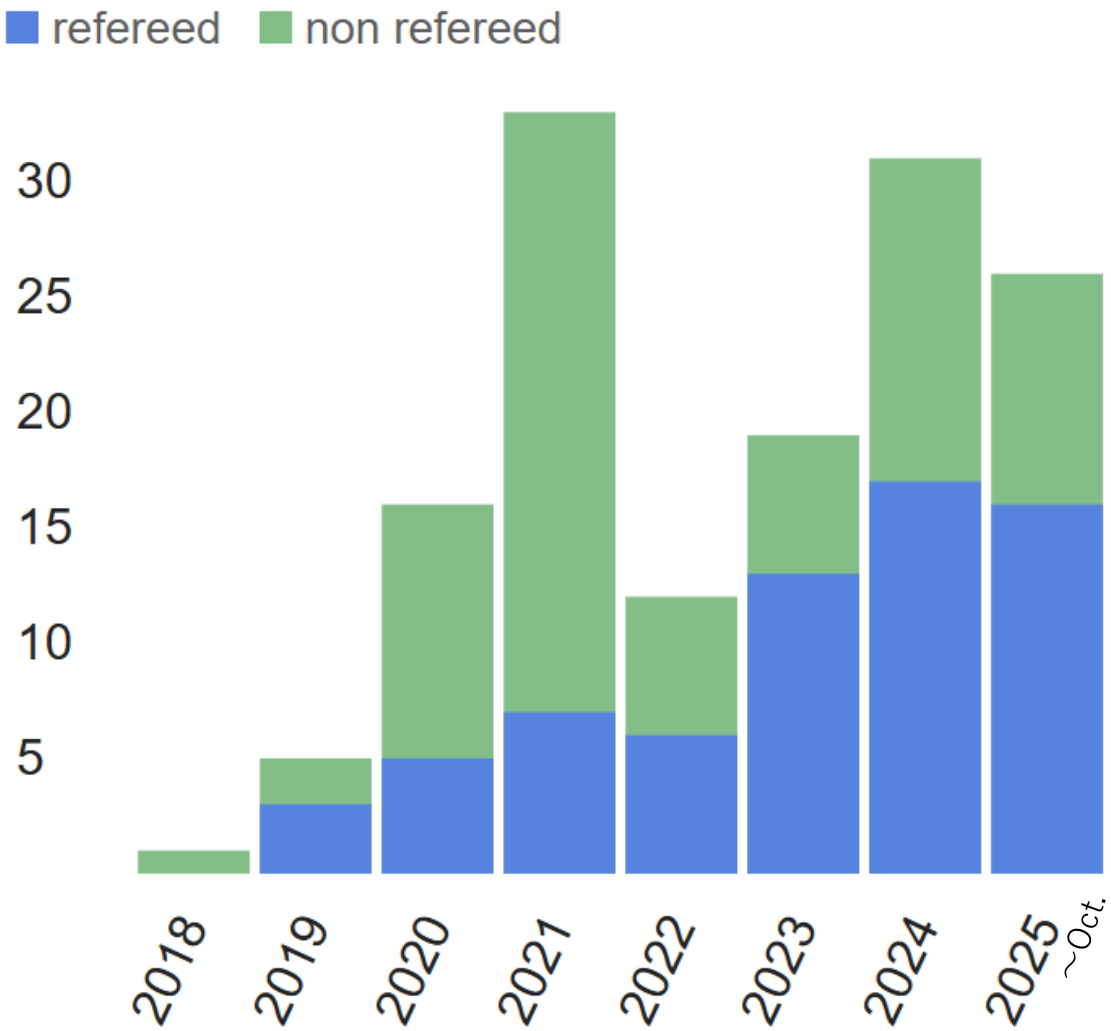




Diversification of Participating Institutions

The network is steadily broadening its base, reaching users throughout Japan.

SEIMEI open-use : Publications



- Showing a **Steady Increasing** Trend
  Currently about **two papers per month**.
- In the past three years, the increase has been largely driven by **TriCCS**.
- Science papers based on **GAOES-RV** data will be published soon — several have already been submitted.
- A press release for Namekata et al. (to appear in Nature Astronomy) is scheduled for October 27, 2025.

ANNOUNCEMENT
Workshop on Space Allocation for New Instruments on SEIMEI Telescope

Following the discussions held at the Seimei UM on Sep. 2–4, we'll held the first meeting on the upcoming/planning observational instruments for SEIMEI Telescope.
As the available space on the Seimei Telescope's Nasmyth focal plane is limited, coordination of its use will be the main topic of discussion at this meeting.

Date : Friday, **November 7, 2025**, 9:00–12:00 (JST) *(tentative)*
Venue : Campus Plaza Kyoto, 5th Floor, Seminar Room 2 + **Online**

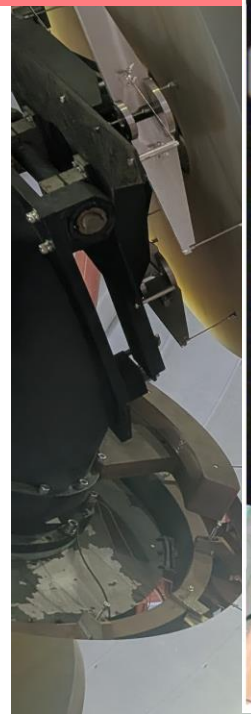
11/4-6 GOPIRA workshop will be held at the same place.

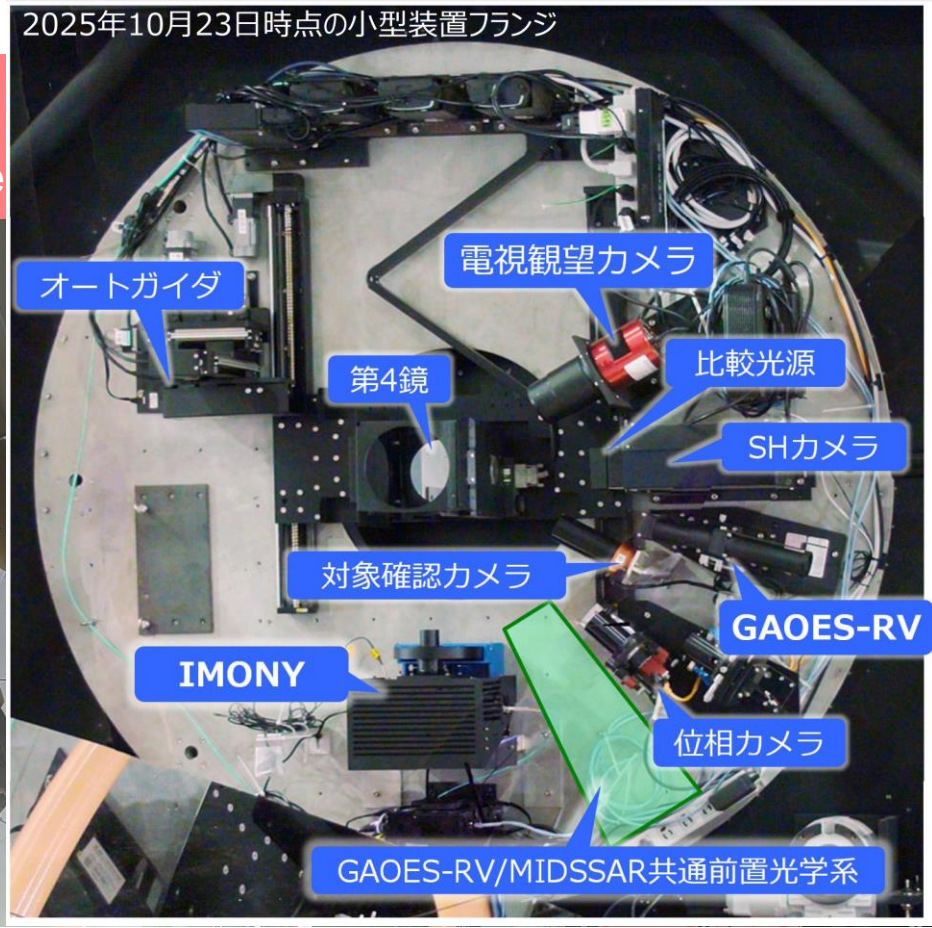
If you are planning to propose or bring a new observational instrument to SEIMEI Telescope in the future, please join the meeting.

Deadline

On-site participation + travel support request: Fri. 10/31/2025
On-site participation: Tue. 11/4/2025
Online participation: Thu. 11/6/2025

Please see our announcement e-mail on tennet / GOPIRA.

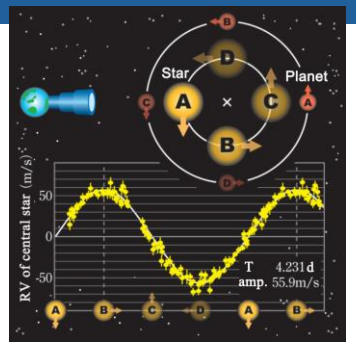




188-cm Telescope

- Built in 1960.
- Operating through an agreement between NAOJ / Tokyo Tech (Science Tokyo) / Asakuchi-city).
- Based on the **fees paid by telescope users**.
  ➡ electricity, maintenance etc.
  No operation fees from NAOJ budget

Not Open Use

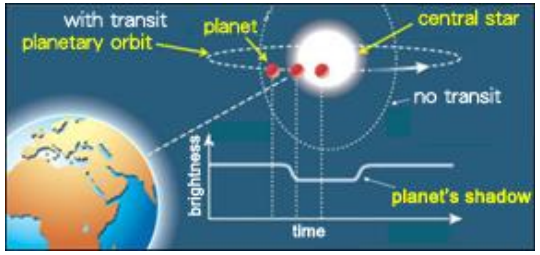


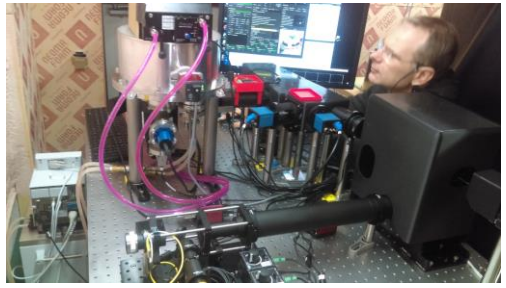
Doppler search w/HIDES-F

- From early 2000s, **more than 50 planets** discovered using I2-cell on the high dispersion spectrograph (HIDES).
- The planets discovered account for 30% of the world's discoveries in giant stars.
- Extension planned to smaller and farther planets for searching solar-system analogues.

Transit measurement with MuSCAT

- **Photometry accuracy of ~0.2mmag**
- A worldwide network built with 3 identical instruments for **24-hr continuous observation.**
- Follow-up of PLATO be conducted.





Doppler imager JOVIAL

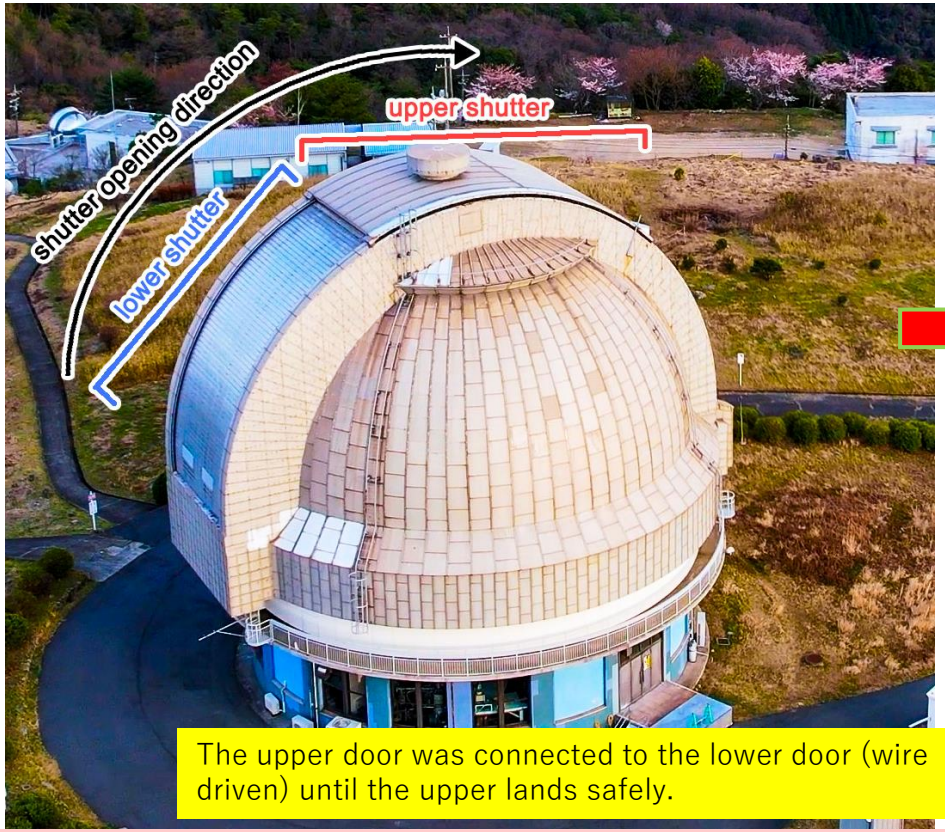
- **Joint Research by France, USA, and Japan**
- 24-hour continuous obs. using telescopes at three locations
- By precisely observing the oscillations on the surfaces of Jupiter and Saturn, researchers aim to understand their internal structures.

Development base for New tech “Astro-comb”

- **Joint development with AIST** since 2014.
- RV measurement accuracy
  Several tens of cm/s (theoretical limit <10 cm/s)
  [Conversion of spectral image drift on the detector into RV]
- Improvement of the spectrograph for that high precision also on-going.
- The results be applied to **Subaru and TMT**.

ex. HDS-comb, Super-HRS comb

Dome Slit accident on Sep 29, 2022



The upper door was connected to the lower door (wire driven) until the upper lands safely.

- **The upper door of the slit fell and stuck** on the dome structure.
- The upper door might be caught and fastened to a damaged part of the upper door rail.
  → The joint between the upper and the lower doors might be disconnected.
  → After the lower door was opened alone, the upper door fell down freely.
- The main cause is the **aging** of the dome (built in 1960).
- The dome slit **could not be closed from 40% open**.

Observations have been suspended.

The restoration work plan has been fixed for March 2024.

Budgetary support from
NAOJ/NINS, Asakuchi-city, Tokyo Tech

Recovery of 188cm Telescope

- The dome, which had been out of operation since Sep. 2022, **has been restored**. (Dec. 2024)
  - The new slit opens horizontally (reducing opening/closing time from 11 → 2 minutes)
  - Enabling long-term operation with only minor maintenance.
- **Scientific observations resumed in Mar. 2025**.
- Primary mirror re-coating (Jun. 2025)

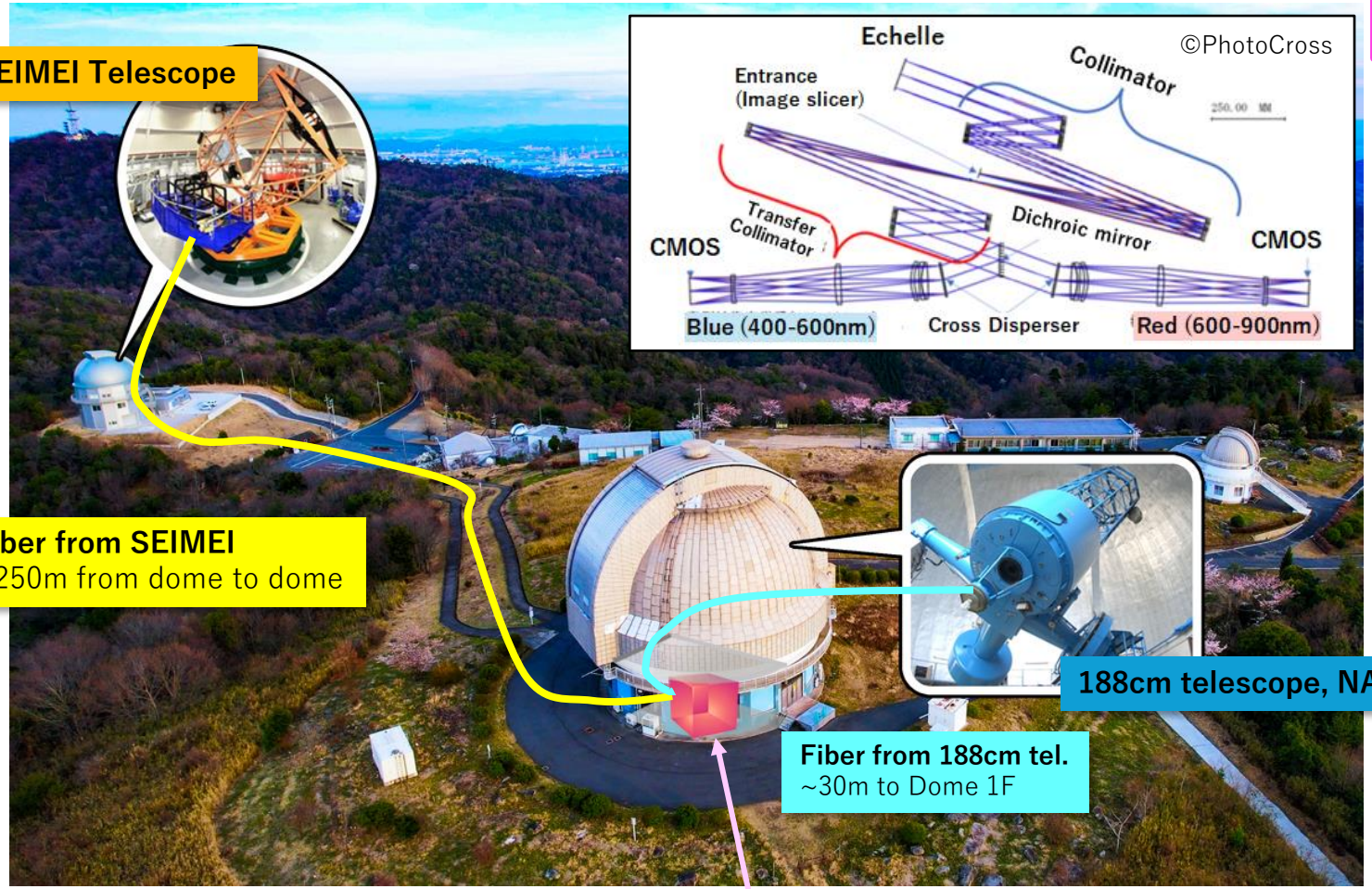
Started a new project funded by JSPS
(*Specially promoted research, PI: B. Sato)
FY2025 – FY2030

for 188cm & SEIMEI

Super-High-Resolution Spectrograph

Started w/ JSPS KAKENHI (Grant-in-Aid for Specially Promoted Research)

PI : Sato, B. (Science Tokyo)
FY2025-2030



HRS w/ 5 "Super"

① **Super** high wavelength resolution
R~300,000
② **Super** precise wavelength standard
<10cm/s by **Astro-comb**
③ **Super** high time resolution
~sec scale by large format **CMOS**
④ **Super** wide wavelength region
400-900nm by large format CMOS
⑤ **Super** long-term & high cadence observation
> year by **188cm telescope + Seimei**

- ✓ Understanding the **variability phenomena of solar-type stars** at the cm/s level
- ✓ Searching for **Earth-like planets** orbiting solar-type stars in the vicinity of the Sun

JOB VACANCY ANNOUNCEMENT
Project Assistant Professor at Okayama Branch, Subaru Telescope, NAOJ

Participate in the **development of a super high-resolution spectrograph** to be installed on the 188cm and Seimei Telescope, as part of
the Grant-in-Aid for Scientific Research (Specially Promoted Research) project
"Innovative Exoplanet Exploration via Ultra-Precise Spectroscopy: Revealing Stellar Variability at the cm/s Level"
(Principal Investigator: Prof. Bun'ei Sato, Institute of Science Tokyo).

Employment Period : From as early as possible after **April 1, 2026 to March 31, 2031**

Deadline 11/14/2025(Fri) JST 12:00

Extended!

Please see NAOJ web-site or contact with me (Tajitsu) for more details.