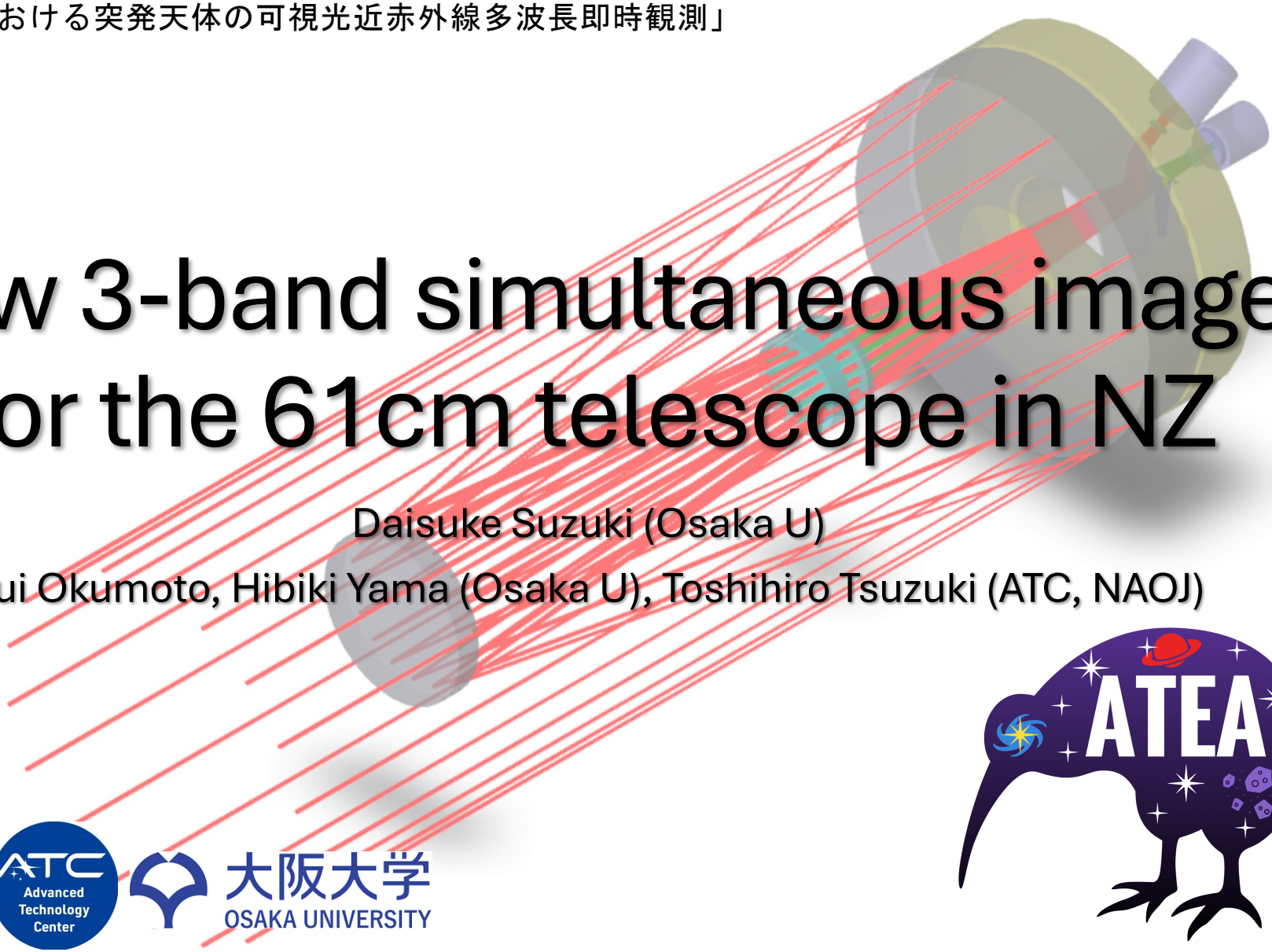
公募研究「南天における突発天体の可視光近赤外線多波長即時観測」



New 3-band simultaneous imager for the 61cm telescope in NZ

Daisuke Suzuki (Osaka U)

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国立天文台 NAOJ National Astronomical Observatory of Japan

ATC Advanced Technology Center

大阪大学 OSAKA UNIVERSITY

ATEA

Need mutli-band observations for southern sky

笹田さん作成(slide from Sasada-san)

61cm B&C telescope to be updated for NIR

- ✓ @Mt.John Observatory, (43°59.2’S, 170°27.9’E)
- ✓ Primary mirror : 61cm diameter
- ✓ Managed by Canterbury U
- ✓ Relatively easy to get the telescope time
- ✓ An optical 3-band camera (tripole5) was used to be used for follow-up of μlensing events and GW events (incl. GW170817).
- ✓ **Tripole5 camera (g,r, i) is not available as the telescope F is changed from F/13.5 to F/6.25**

「南天における突発天体の可視光近赤外線多波長即時観測」

“Rapid Opt-NIR observations of transients in the Suthern sky”

- **Update the B&C telescope to have a NIR camera along with an optical camera**
- **This will be the first dedicated NIR astronomical instrument in NZ**

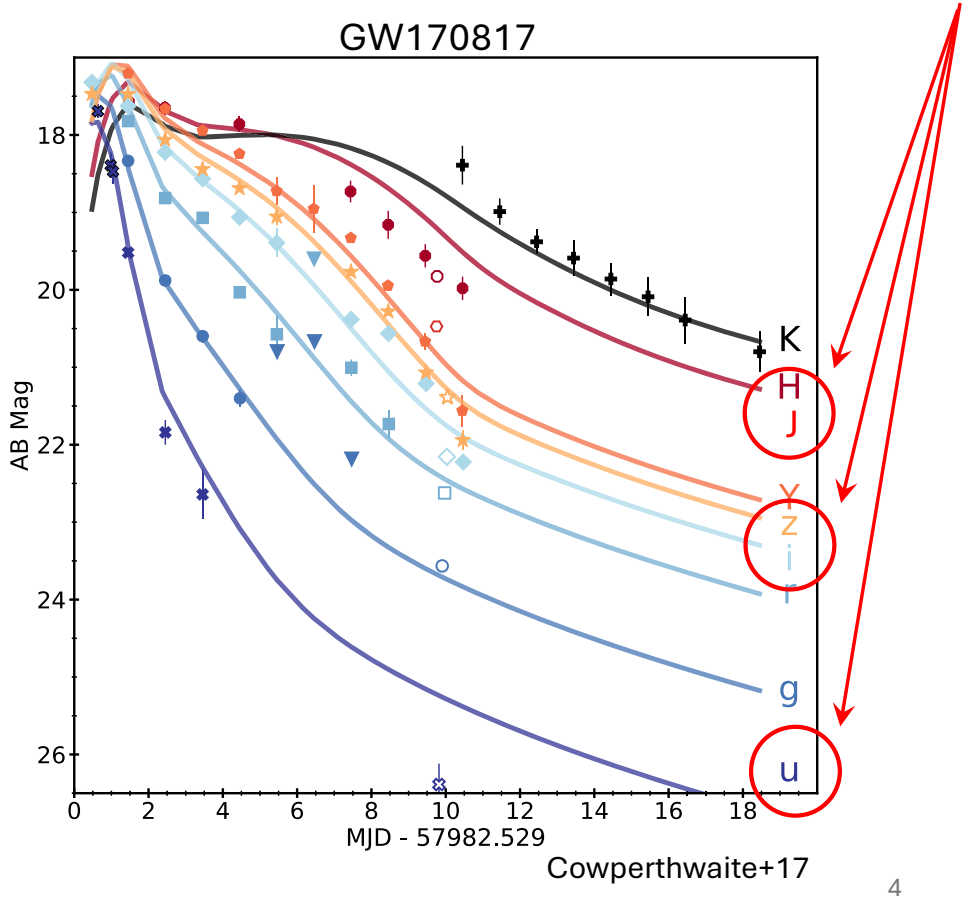
(except for NASA’s SOFIA mission that flew over NZ several years ago)

ATEA (Aotearoa Triple-band Equipment for Astrophysics)

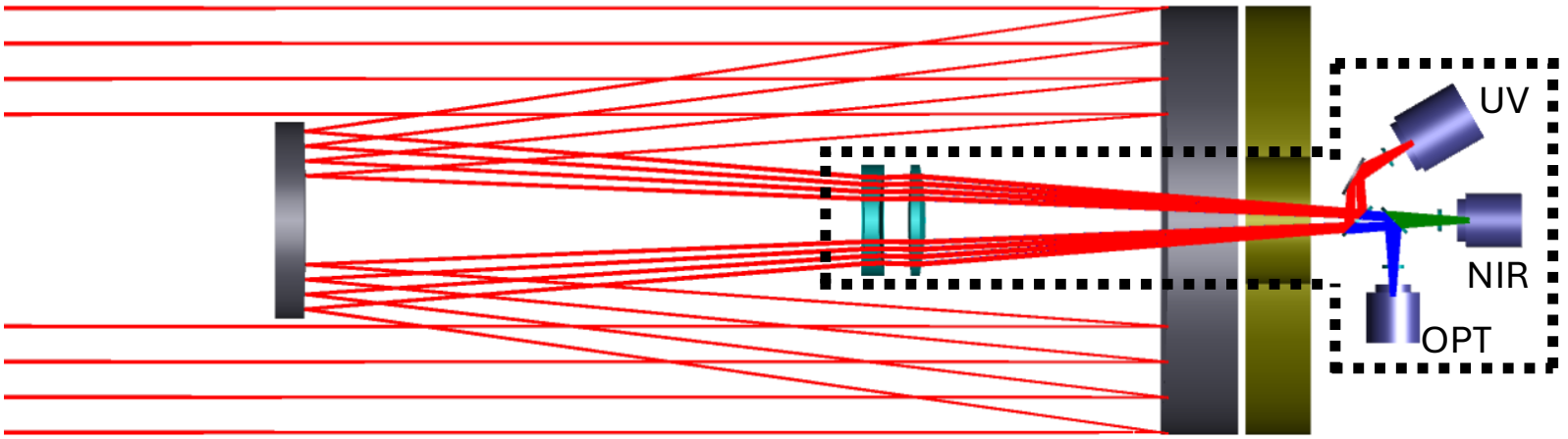
- Our original idea was to build a 3-band camera with two optical cams and one NIR cam.

- **Our new 3-band camera has UV, Optical and near-IR imagers.**

ATEA can observe

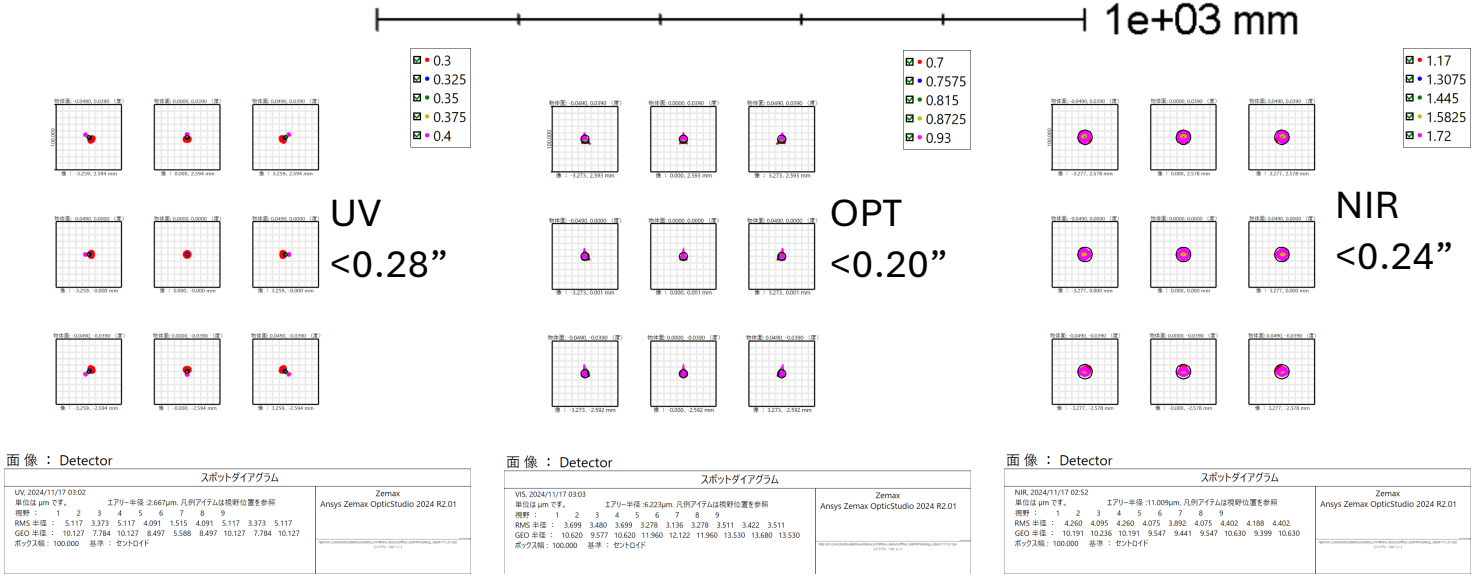


Optical design of ATEA (work by H. Yama, Y. Okumoto and T. Tsuzuki)



We design & fabricate/procure the parts in the enclosed area

- ❑ **Conversion Lens 1**
- ❑ **Conversion Lens 2**
- ❑ **Dichroic mirror 1**
- ❑ **Dichroic mirror 2**
- ❑ Flat mirror for UV
- ❑ UV camera *(Out of scope)*
- ❑ **OPT camera**
- ❑ NIR camera
- ❑ NIR filter *(Already we have)*
- ❑ **UV filter**
- ❑ **OPT filter**
- ❑ **Housing**



Doable!!

Schedule

- Finalize optical design
- Procure lens materials
- Design the lens unit

- Procure dichroic mirrors, lens polish, coating
- Procure OPT camera, filter
- Finalize camera housing design and fabrication

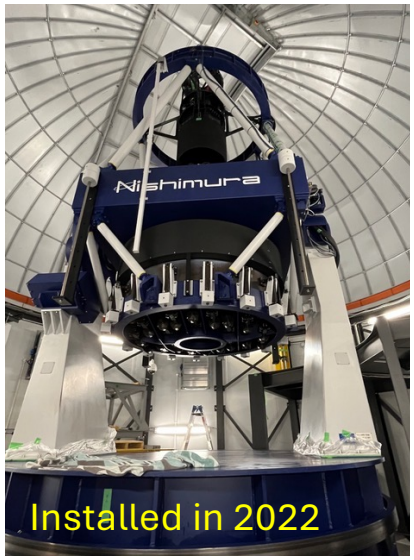
- Camera installation at Mt.John observatory in NZ
- Test observations, asessment/verification

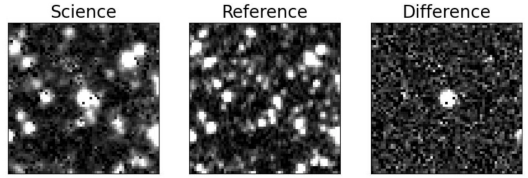
- Summrize the design, fabrication and test observation as a master thesis / paper.

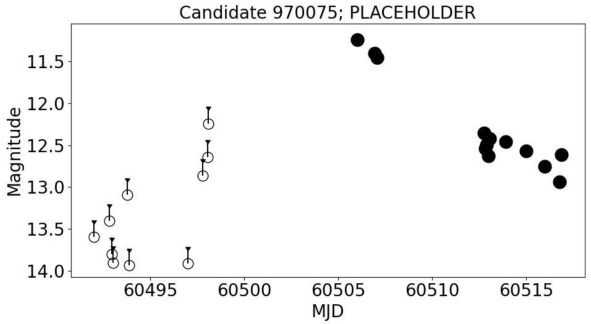
- UV flat mirror, filter and camera will come later as soon as the bugdet is aprroved.

PRIME for transient observations

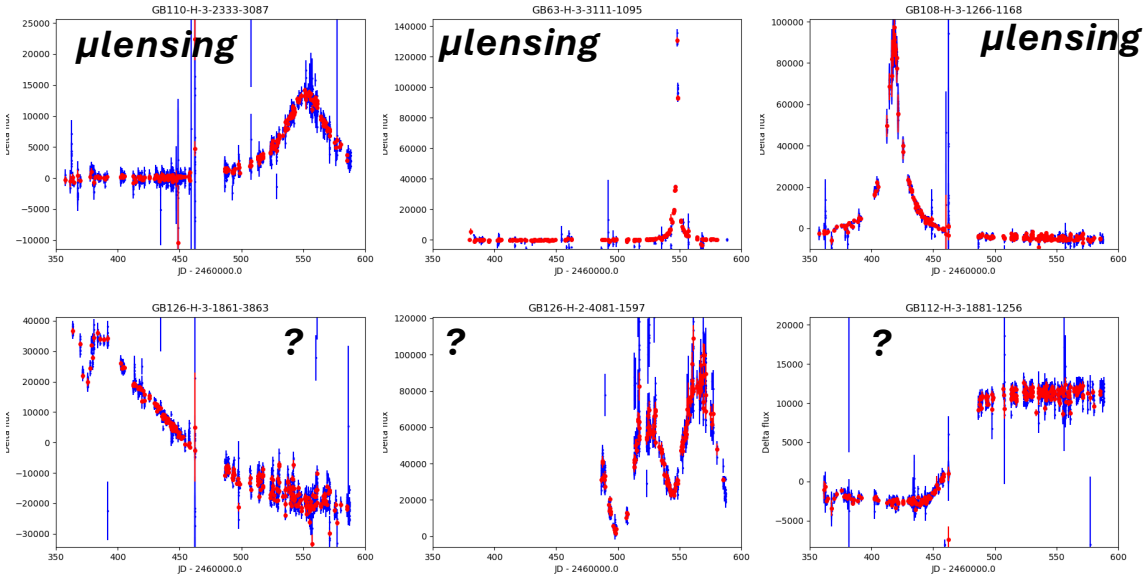
- ✓ NIR 1.8m telescope
- ✓ H-band, wide FOV (1.45deg^2) telescope in South Africa
- ✓ Started bulge observation in 2024
- ✓ Found some NIR microlensing events and transients
- ✓ ToO observations are also conducted for GW, GRBs, etc
- ✓ 30% of All-sky-grid was observed in J-band as reference for ToO observations.

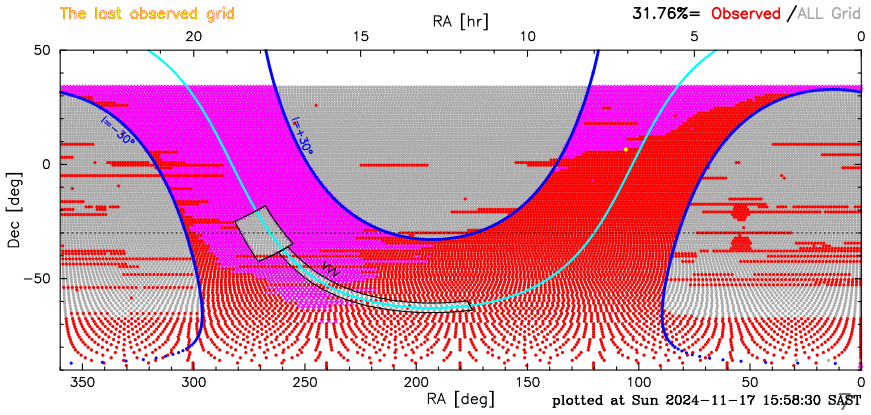






Atel #16824 (Hamada+)

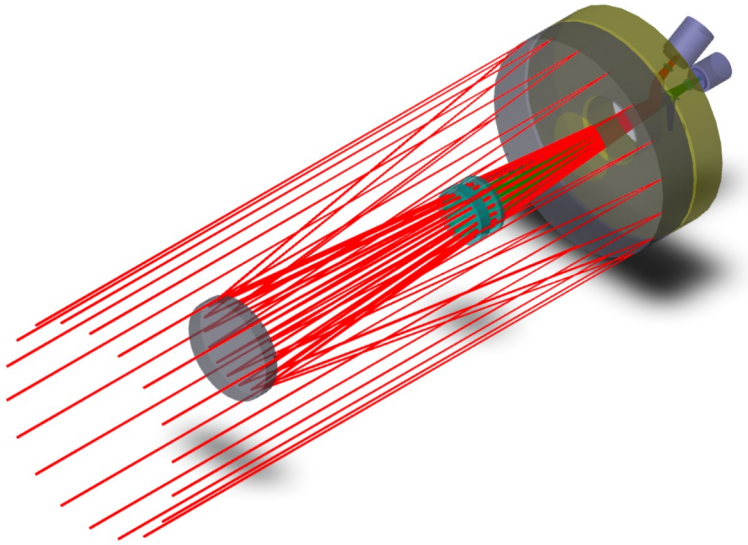


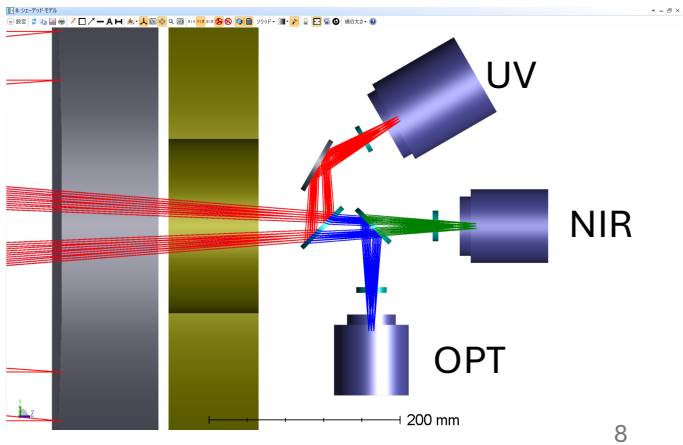


Summary

「南天における突発天体の可視光近赤外線多波長即時観測」
"Rapid Opt-NIR observations of transients in the Suthern sky"

- ATEA : a new 3-band imager with UV, OPT and NIR
  - UV filter & camera is out of scope, but will be added.
- ATEA will be installed on the 61cm B&C telescope in NZ around next summer.
  - UV function will be added in FY26 or later
- PRIME has started the bulge observation and found some transients.





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