Jovial Kick-off Meeting
-First meeting of the Jupiter oscillation network-
April 18-20, 2016, Observatoire de Nice, France

Ishigaki Observatory

~ Ishigakijima Astronomical Observatory and Murikabushi 105cm Telescope ~

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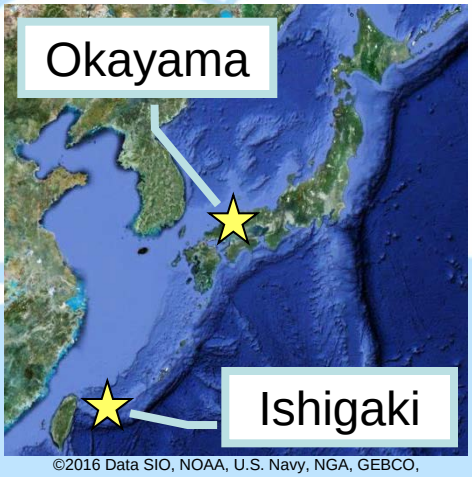
Introduction

- International workshop for exoplanets and disks at Ishigaki island (Ishigakijima) in February 2016
- More than 100 people in attendance including Dr. Guillot
- 1m telescope at Ishigakijima astronomical observatory (IAO) for transient objects and Solar System objects
- IAO may be a useful backup option of Okayama observatory in JOVIAL project



Location


10,000km
Nice
Okayama
Ishigaki
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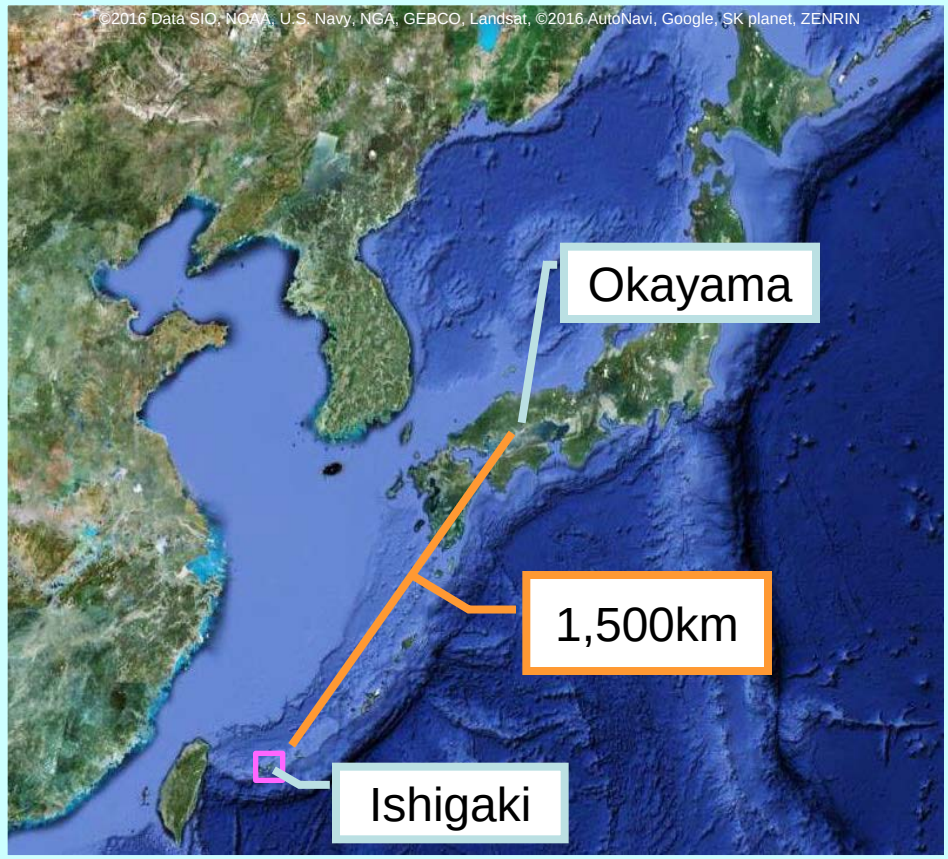
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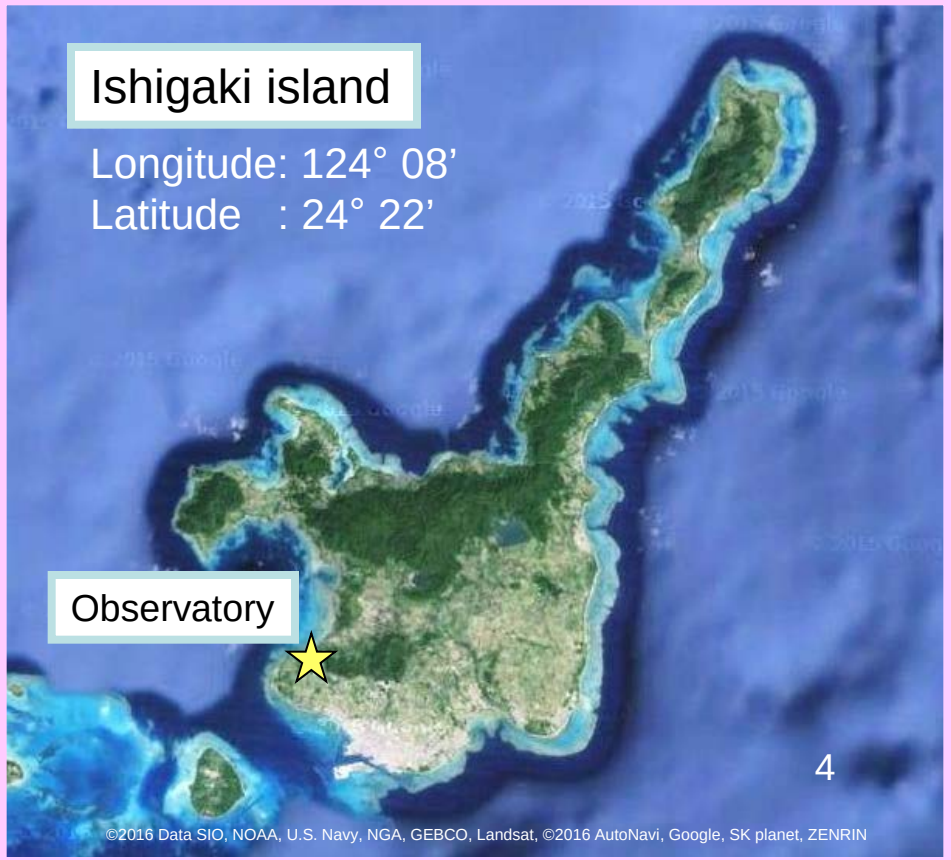
Okayama
1,500km
Ishigaki


Ishigaki island
Longitude: 124° 08’
Latitude : 24° 22’
Observatory
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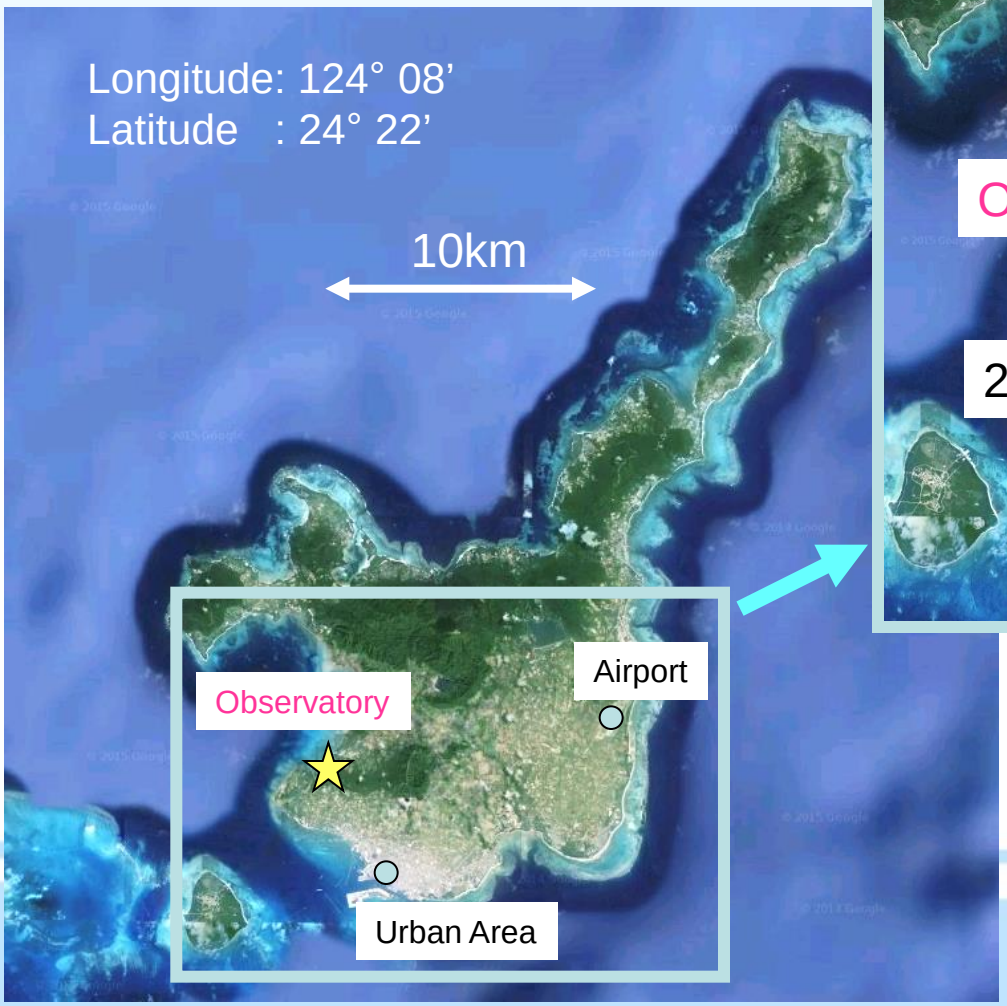
Location



Location: Top of Mt. Maesedake
(Altitude: 197m)
Access：20 min from Urban Area by Car

Location

Longitude: 124° 08’, Latitude: 24° 22’, Altitude: 197m

Observatory

- Astronomical Observatory on Southwest Corner of Japan
- One of the institutes of the national astronomical observatory of Japan (NAOJ) as well as Okayama astrophysical observatory (OAO)
- 10° south from Japanese mainland appropriate for the observations the objects around the ecliptic plane
- Atmosphere of the site is not affected by jet stream so that a scintillation of star is well suppressed

1st floor: Telescope Control Room, Office
2nd floor: Telescope Dome

Observatory

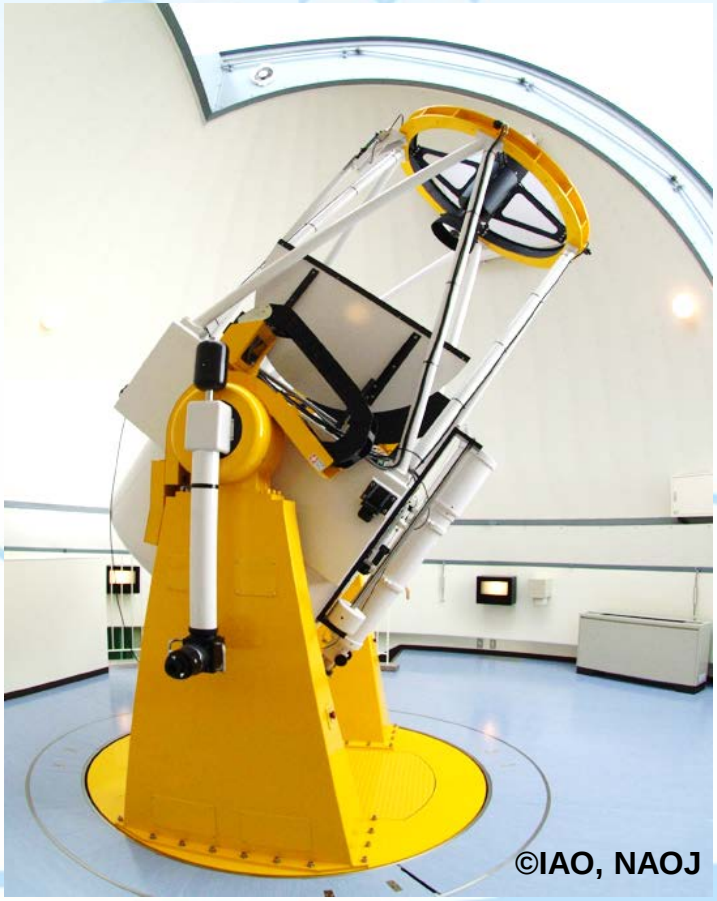
- Role of IAO
  - Observation of transient objects and Solar System objects under the good geographic and atmospheric conditions
  - Contribution for astronomical education and promotion with public outreach

    → IAO was opened in April, 2006
- Seeing
  - ~1.5 arcsec (FWHM) from July to September (summer)
  - ~2.5 arcsec (FWHM) otherwise
- Rate of fine weather
  - 30-50% from July to September (summer)
  - 10-20% otherwise

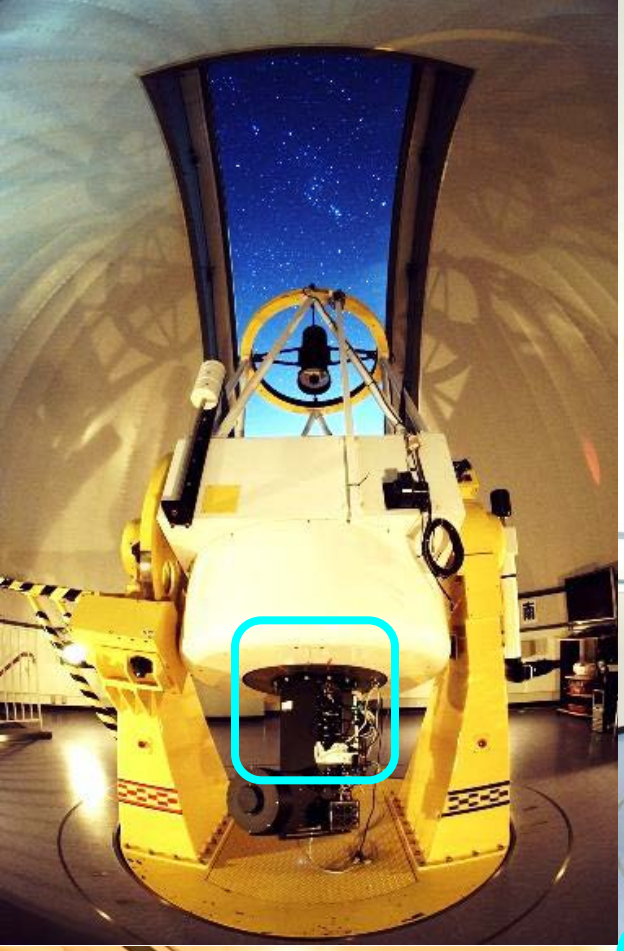
Telescope

- Murikabushi 105cm telescope (F12)
  - Ritchey–Chrétien telescope
  - Altazimuth mount

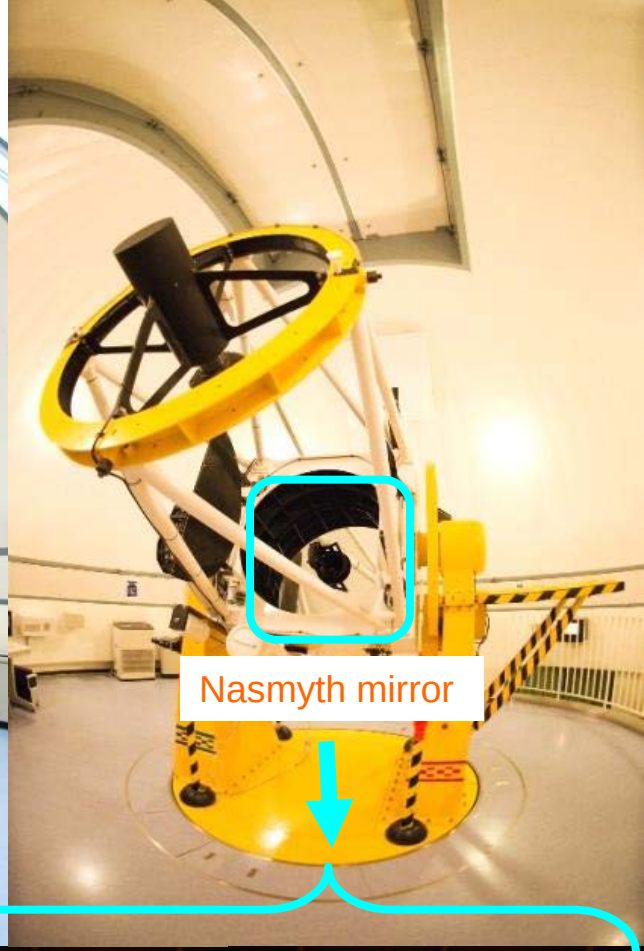
- Three Foci
  1. Cassegrain focus (for research, equipped image rotator)
  2. Nasmyth focus 1 (→F18 for visual observation, not equipped image rotator)
  3. Nasmyth focus 2 (for research, not equipped image rotator)



- Murikabushi: a local dialect name of the Pleiades star cluster

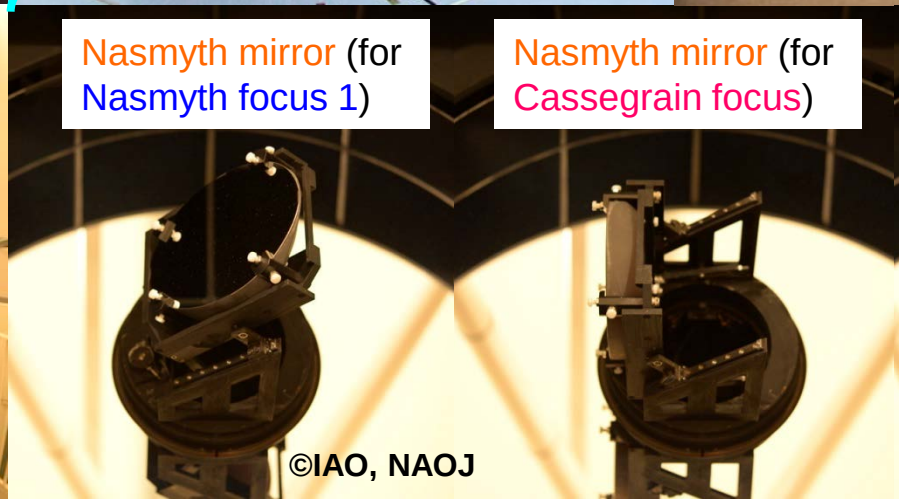


Nasmyth focus 1: F12
(→F18 for visual observation)



Nasmyth mirror

Nasmyth focus 2: F12
(for research)



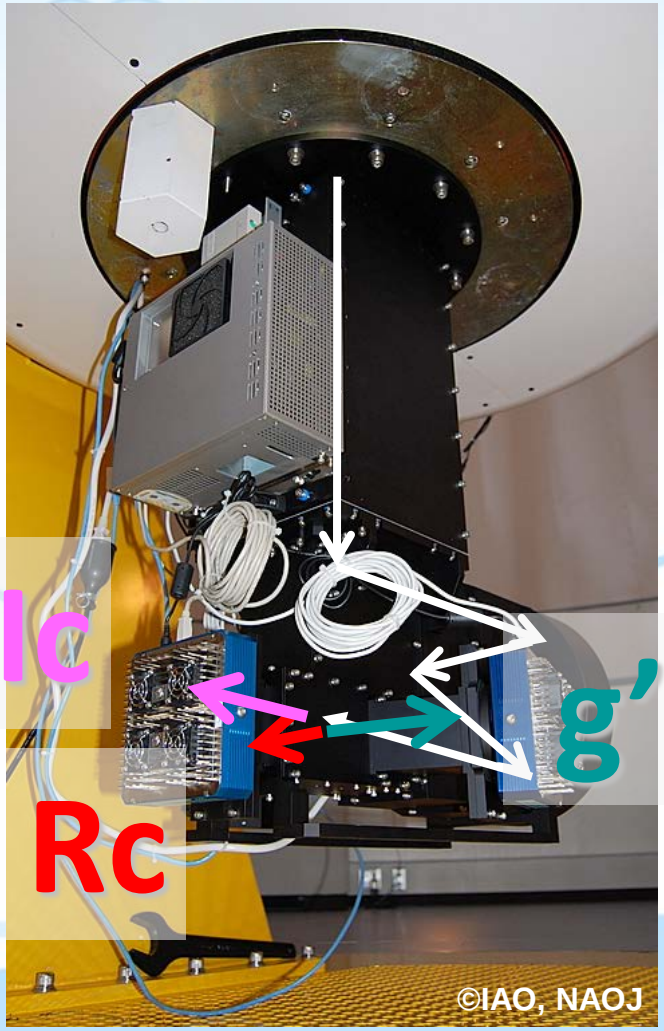
Nasmyth mirror (for
Nasmyth focus 1)

Nasmyth mirror (for
Cassegrain focus)

Nasmyth mirror (for
Nasmyth focus 2)

Instrument

- MITSuME Tricolor CCD Cameras
  - 3-color simultaneously imaging system mounted on the Cassegrain focus with F conversion lens (F12→F6.5)
- Developed for the observation of GRBs
  - MITSuME: Multi-color Imaging Telescopes for Surveys and Monstrous Explosions(Development : Tokyo Tech, Kyoto Univ., and NAOJ)
- Spec
  - CCD Camera：Apogee Alta U6
  - Number of Pixels：1024×1024
  - Filter：g', Rc, Ic
  - Field of View：12.3 ×12.3 arcmin
  - Pixel Scale：0.72 arcsec/pix
  - Detection Limit (mag) : g'=18.7, Rc=19.0, Ic=17.8 [S/N=10, Exp.=1min.]



Observation

- Transient Object and Solar System Object
  - GRB (Gamma-Ray Burst, MITSuME project, GROWTH project)
  - Comet and Asteroid
  - Other Object (domestic observational collaboration)
    - Japanese university and observatory network
      - OISTER(Optical and Infrared Synergetic Telescopes for Education and Research) [ex. supernova, variable star]
    - JAXA, Japan Spaceguard Association

→17 refereed papers (9 refereed papers for Solar System objects)

  - Observational experiments for high school and undergraduate students [ex. asteroid survey, exoplanet transit]

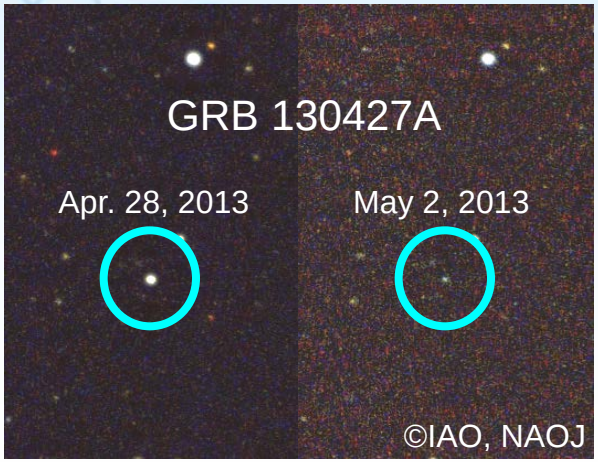
Refereed papers of IAO

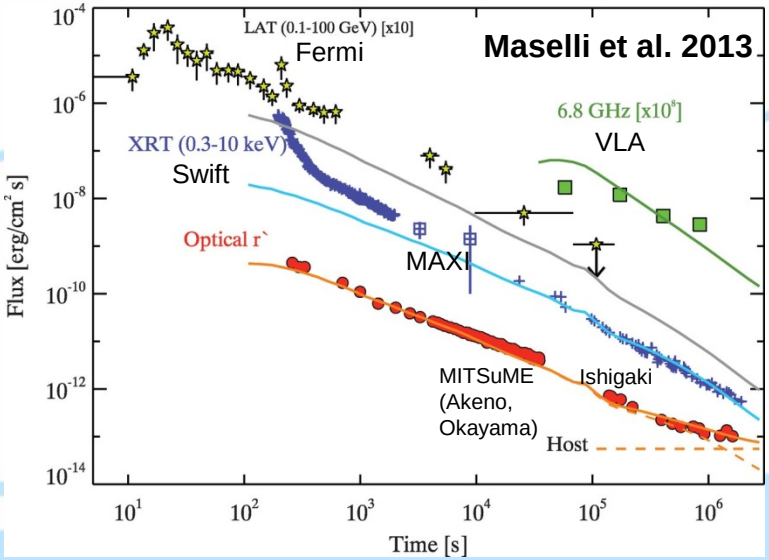
1. Ishiguro et al., 2010, ApJ, 714, 1324
   "2007 Outburst of 17P/Holmes: The Albedo and the Temperature of the Dust Grains"
2. Müller et al, 2011, A&A, 525, A145
   "Thermo-physical properties of 162173 (1999 JU3), a potential flyby and rendezvous target for interplanetary missions"
3. Ishiguro et al., 2011, ApJ, 740, L11
   "Observational Evidence for an Impact on the Main-belt Asteroid (596) Scheila"
4. Ishiguro et al., 2011, ApJ, 741, L24
   "Interpretation of (596) Scheila's Triple Dust Tails"
5. Kim et al., 2012, ApJ, 746, L11
   "Multiband Optical Observation of the P/2010 A2 Dust Tail"
6. Kataoka et al. 2012, ApJ, 757, 176
   "Toward Identifying the Unassociated Gamma-Ray Source 1FGL J1311.7-3429 with X-Ray and Optical Observations"
7. Hanayama et al. 2012, PASJ, 64, 134
   "Asymmetric Dust Jets and Extended Structure of 22P/Kopff Observed During 2009 Appearance"
8. Itoh et al. 2013, ApJ, 775, L26
   "Minute-scale Rapid Variability of the Optical Polarization in the Narrow-line Seyfert 1 Galaxy PMN J0948+0022"
9. Maselli et al. 2013, Science, 343, 48
   "GRB 130427A: a Nearby Ordinary Monster"
10. Ishiguro et al., 2014, ApJ, 787, 55
    "Outbursting Comet P/2010 V1 (Ikeya-Murakami): A Miniature Comet Holmes"
11. Itoh et al. 2014, PASJ, 66, 108
    "Variable optical polarization during high state in gamma-ray loud narrow line Seyfert 1 galaxy 1H 0323+342"
12. Melandri et al. 2014, A&A, 572, A55
    "The nature of the late achromatic bump in GRB 120326A"
13. Ishiguro et al. 2015, ApJ, 798, L34
    "Dust from Comet 209P/LINEAR during its 2014 Return: Parent Body of a New Meteor Shower, the May Camelopardalids"
14. Yatsu et al. 2015, ApJ, 802, 84
    "Multiwavelength observations of the black widow pulsar 2FGL J2339.6-0532 with OISTER and Suzaku"
15. Yamanaka et al. 2015, ApJ, 806, 191
    "OISTER Optical and Near-Infrared Observations of Type Iax Supernova 2012Z"
16. Kwon et al. 2016, ApJ, 818, 67
    "Monitoring Observations of the Jupiter-Family Comet 17P/Holmes during its 2014 Perihelion Passage"
17. Yamanaka et al. 2016, PASJ, accepted
    "OISTER Optical and Near-Infrared Observations of the Super-Chandrasekhar Supernova Candidate SN 2012dn: Dust Emission from the Circumstellar Shell"

Blue : Studies of Solar System Objects

Observation

- Study for the mechanism of GRBs and the formation history of first stars
- Detections and upper limits to GCN(Gamma-ray Coordinates Network) Circular 70 times (@IAO) in 2007-2016.
- Refereed papers
  - Maselli et al., Science, 343, 48 (2013)
  - Melandri et al., A&A, 572, A55 (2014)

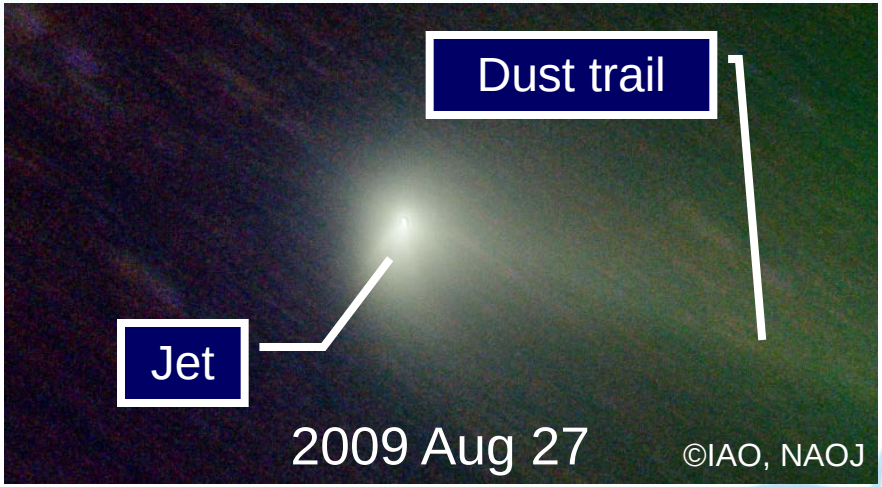




Multiwavelength light curves of GRB 130427A

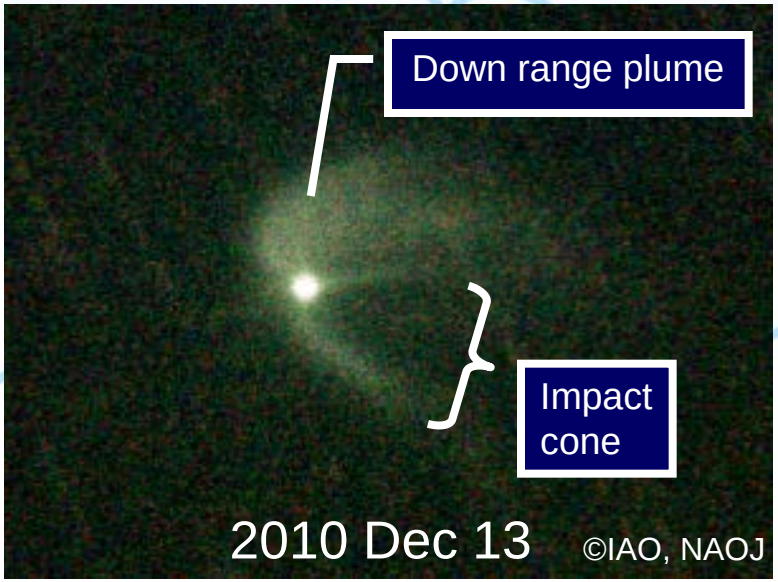
Observation

22P/Kopff: Jet and dust trail



Hanayama H., Ishiguro M. et al.
PASJ, 64, 134 (2012)

Asteroid (596) Scheila:
appearance of three tails



Ishiguro M., **Hanayama H.** et al.
APJ, 740, 1, L11 (2011)
APJ, 741, 1, L24 (2011)

Observation

- Jupiter
  - Camera:DFK41AU02@15fps(exp1/16sec)
  - Focus: Nasmyth focus 1 (F18)
  - Date: 2015 May 15
    - Ang-diam(D)= 36.1 arcsec
    - Apmag(V) = -2.0 mag
    - S-brt(S) = 5.5 mag/arcsec^2
- Saturn
  - Camera:DFK41AU02@7.5fps(exp1/8sec)
  - Focus: Nasmyth focus 1 (F18)
  - Date: 2015 May 15
    - Ang-diam(D)= 18.5 arcsec
    - Apmag(V) = 0.9 mag
    - S-brt(S) = 7.0 mag/arcsec^2

DFK41AU02(1/2”CCD)

Prospect

- Toward the JOVIAL project
  - The site is appropriate for the observations for the objects around the ecliptic plane, and the weather is fine during summer
  - The observing time allocation will be possible
  - Jupiter @ IAO
    - 2018/05/09 21h-28.5h (7.5hr) (D=44.8,V=-2.5,S=5.5) opposition
    - 2018/06/09 20.5h-26h (5.5hr) (D=43.5,V=-2.4,S=5.5)
    - 2018/07/09 20.5h-24h (3.5hr) (D=40.1,V=-2.3,S=5.5) summer
  - Saturn @ IAO
    - 2018/06/27 21.5h-27h (5.5hr) (D=18.4,V=0.9,S=7.0) opposition
    - 2018/07/27 20.5h-26h (5.5hr) (D=18.1,V=1.1,S=7.1) summer
    - 2018/08/27 20h -24h (4.0hr) (D=17.4,V=1.3,S=7.2) summer
  - The installation test of the instruments and the observation test for the backup are welcome!

Summary

- Location
  - observatory on southwest corner of Japan
- Telescope and Instrument
  - 105cm reflector and three-color simultaneous imaging system
- Observation
  - transient objects such as gamma-ray burst afterglows
  - comets, asteroids, planets
- Prospect
  - IAO may be a useful backup option of OAO in JOVIAL project