Follow-up Observations for Tomo-e Transients

Ji-an Jiang & Keiichi Maeda

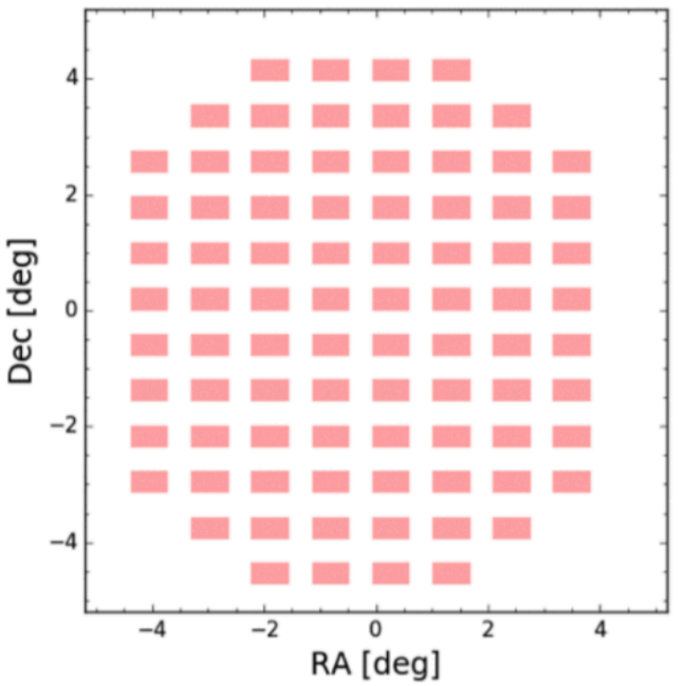
Northern sky transient survey

PI: Tomoki Morokuma

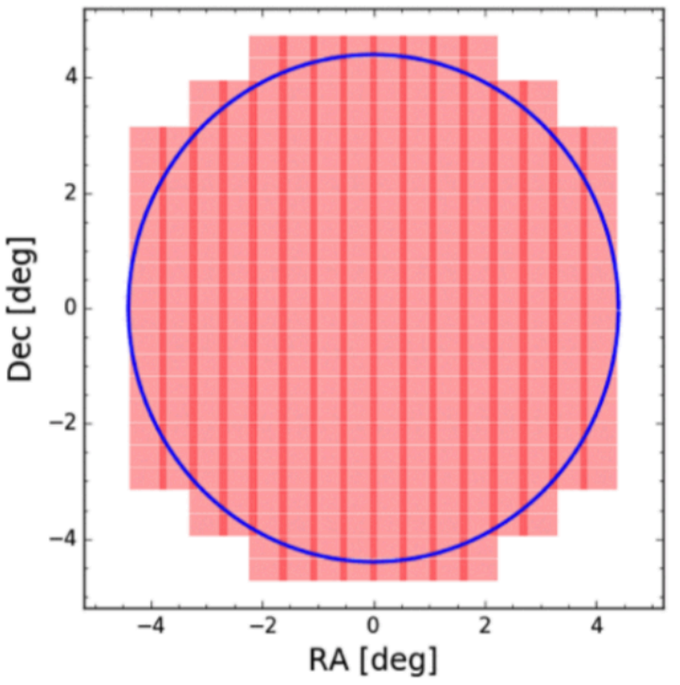
- **Survey plan: 7000 deg² - 2hr cadence - 18 mag**
  - 1 “visit” = 60 deg² in 1 min
    - 12 x 0.5 sec = 6 sec (~18 mag depth)
    - 2 x 2 dithering (to fill the gap)
  - 2 hr cadence (= 120 visits)
    => ~7000 deg² in total (elevation > 40 deg)
  - No filter (effectively g + r)
  - Keep detection information of 2 Hz images

- **Schedule**
  - 2018 November - (Q1, FOV 5 deg²)
  - 2019 April - (Q1-4, FOV 20 deg²)

1 exposure



2 x 2 dithering



By Tomoki Morokuma

What is the best survey mode for Tomo-e?

7000 sq.deg / 2 hrs?

or even shorter?

Japanese optical/NIR telescopes

Seeing: ~1-2"
Clear night rate: ~40–50%

∅= 1.6 m
Nayoro Observatory
Hokkaido University

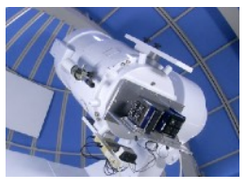
∅= 1.05 m
Kiso Observatory
The University of Tokyo

∅= 0.5 m
MITSuME Telescope (Akeno)
Tokyo Institute of Technology

∅= 0.55 m
Saitama University

∅= 2.0 m
Nishi-Harima Astronomical Observatory
University of Hyogo

∅= 1.88 m
Okayama Astrophysical Observatory
NAOJ



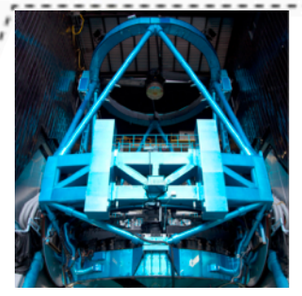
∅= 0.5 m
MITSuME

∅= 1.6 m
VERA Iriki Station
Kagoshima University

∅= 1.5 m
Higashi-Hiroshima Observatory
Hiroshima University

∅= 0.5 m
Ishigakijima
Astronomical Observatory

● Associate Institutions
Gunma Astronomical Observatory
Koyama Astronomical Observatory, Kyoto Sangyo University
Bisei Spaceguard Center



∅= 8.2 m
Subaru
NAOJ

∅= 1.4 m
South African
Astronomical Observatory,
Nagoya University

Credit: NAOJ

Japanese optical/NIR telescopes (03/2019 ~)

Seeing: ~1-2"
Clear night rate: ~40–50%

∅= 1.6 m
Nayoro Observatory
Hokkaido University

∅= 1.05 m
Kiso Observatory
The University of Tokyo

∅= 3.8 m
Kyoto University

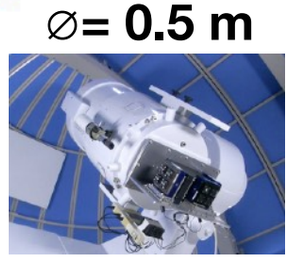
∅= 2.0 m
Nishi-Harima Astronomical Observatory
University of Hyogo

∅= 1.6 m
VERA Iriki Station
Kagoshima University

∅= 0.5 m
Ishigakijima
Astronomical Observatory

∅= 0.5 m
MITSuME Telescope (Akeno)
Tokyo Institute of Technology

∅= 0.55 m
Saitama University



∅= 0.5 m
Okayama
MITSuME

∅= 1.5 m
Higashi-Hiroshima Observatory
Hiroshima University

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Gunma Astronomical Observatory
Koyama Astronomical Observatory, Kyoto Sangyo University
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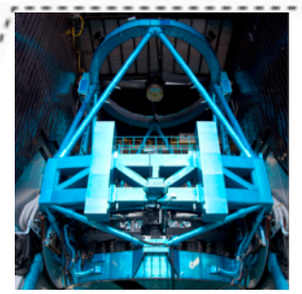

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Subaru
NAOJ

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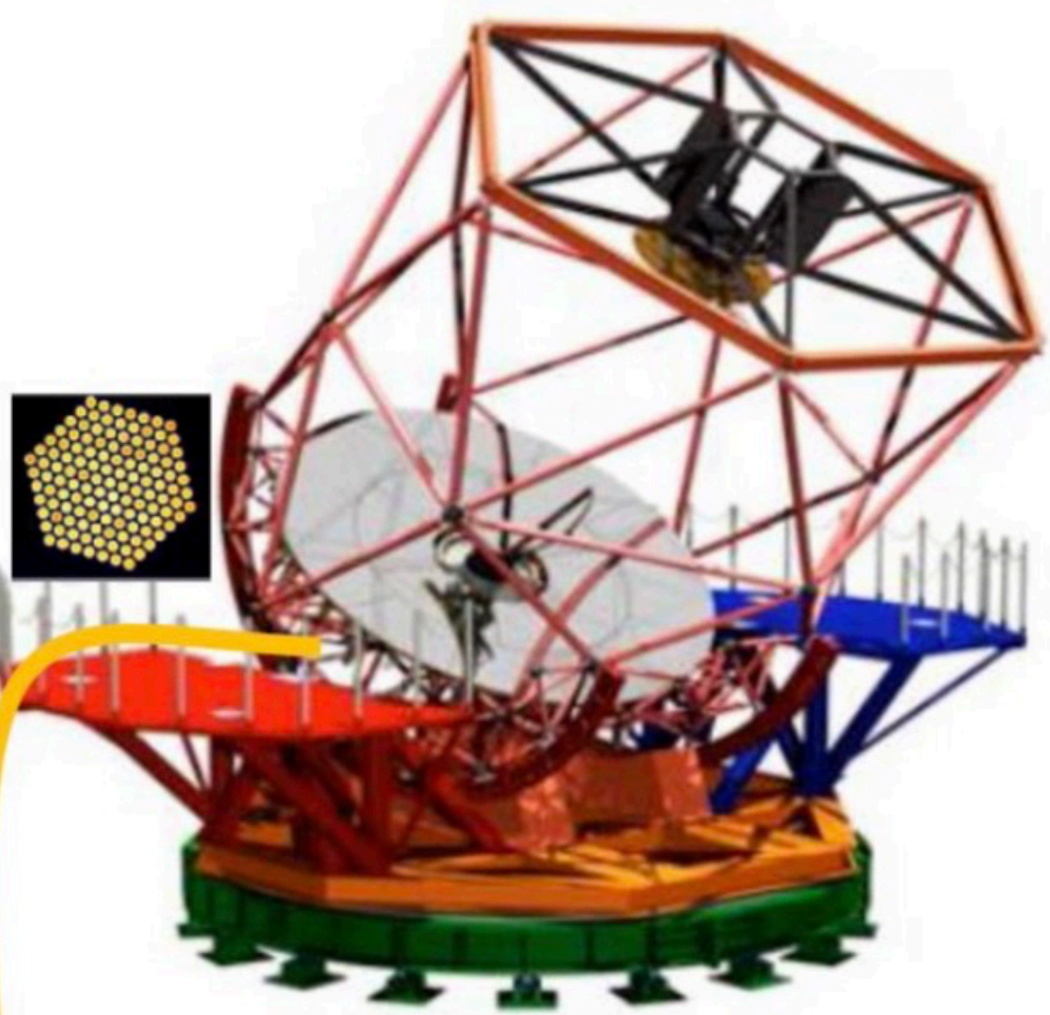
South African
Astronomical Observatory,
Nagoya University

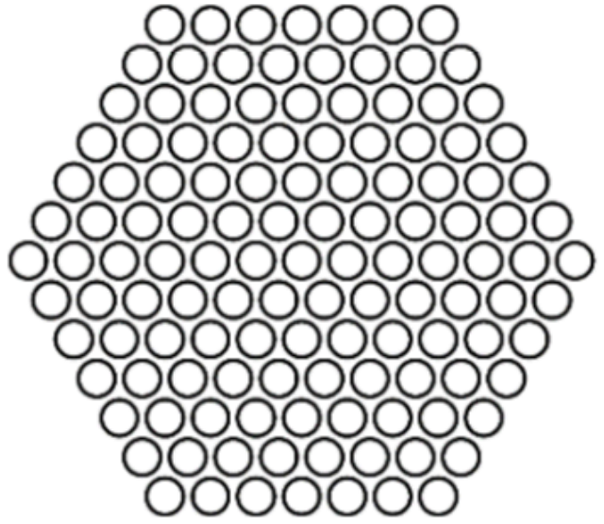
Credit: NAOJ

Kools-IFU on 3.8m

ファイバー型
可視光面分光装置

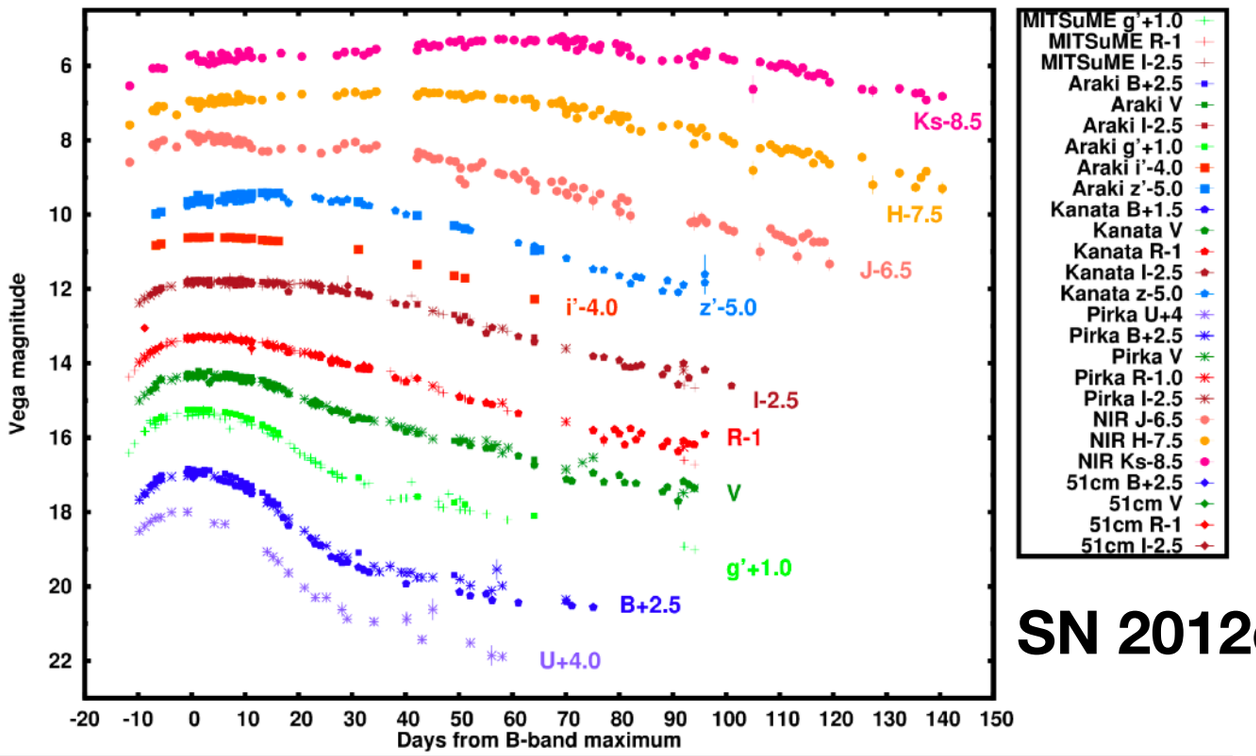


Kools-IFU on 3.8m



Grism	VPH-blue	VPH-red	VPH495	VPH683
# of Faibers	127			
FoV for 1 fiber	0.91’’ (diameter)			
FoV for all	14.8’’ (diameter)			
Filling factor	58%			
Wavelength	4000—8900 Å	5800—10200 Å	4300—5900 Å	5800—8000 Å
Resolution	~800	~800	~1200	~2000
Throughput	5.8%	(~6%)	3.4%	(~6%)

Multiband photometric for Tomo-e transients can be well followed if the weather is fine in Japan.



SN 2012dn

But for spectroscopy...

NAYUTA 2m
3–6 nights/yr
(Normal)

+

KANATA 1.5m
Any time (ToO)

+

Seimei 3.8m
~45–60 nights/yr
(ToO)

+

International Collaborations?
+
ATel Alarm

80-100 spectroscopic nights/yr, but only Seimei can be used for transients > ~17mag.

Japanese optical/NIR telescopes in 2021(?)

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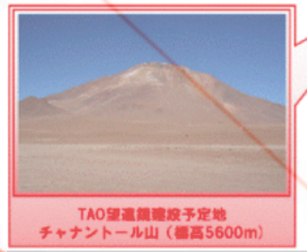
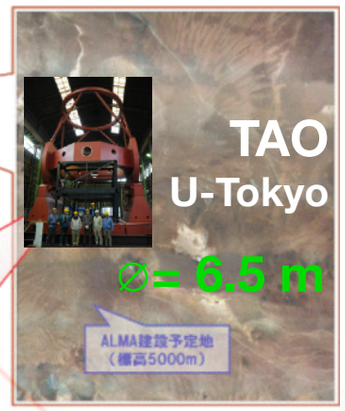


TAO望遠鏡建設予定地
チャナントール山（標高5600m）



TAO
U-Tokyo

∅= 6.5 m

ALMA建設予定地
（標高5000m）

∅= 0.5 m

MITSuME Telescope (Akeno)
Tokyo Institute of Technology

∅= 0.55 m

Saitama University

∅= 0.5 m

Okayama
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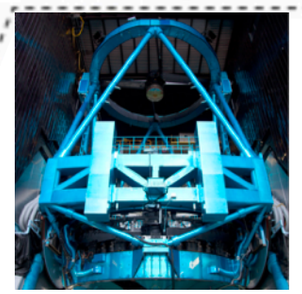

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