

KISS: Kiso Supernova Survey

Masaomi Tanaka

(National Astronomical Observatory of Japan)

On behalf of KISS collaboration

Tomoki Morokuma (Univ. Tokyo)

Nozomu Tominaga, Kensho Mori (Konan Univ.)

many other collaborators

Kiso observatory (1974~)

Altitude: 1130m



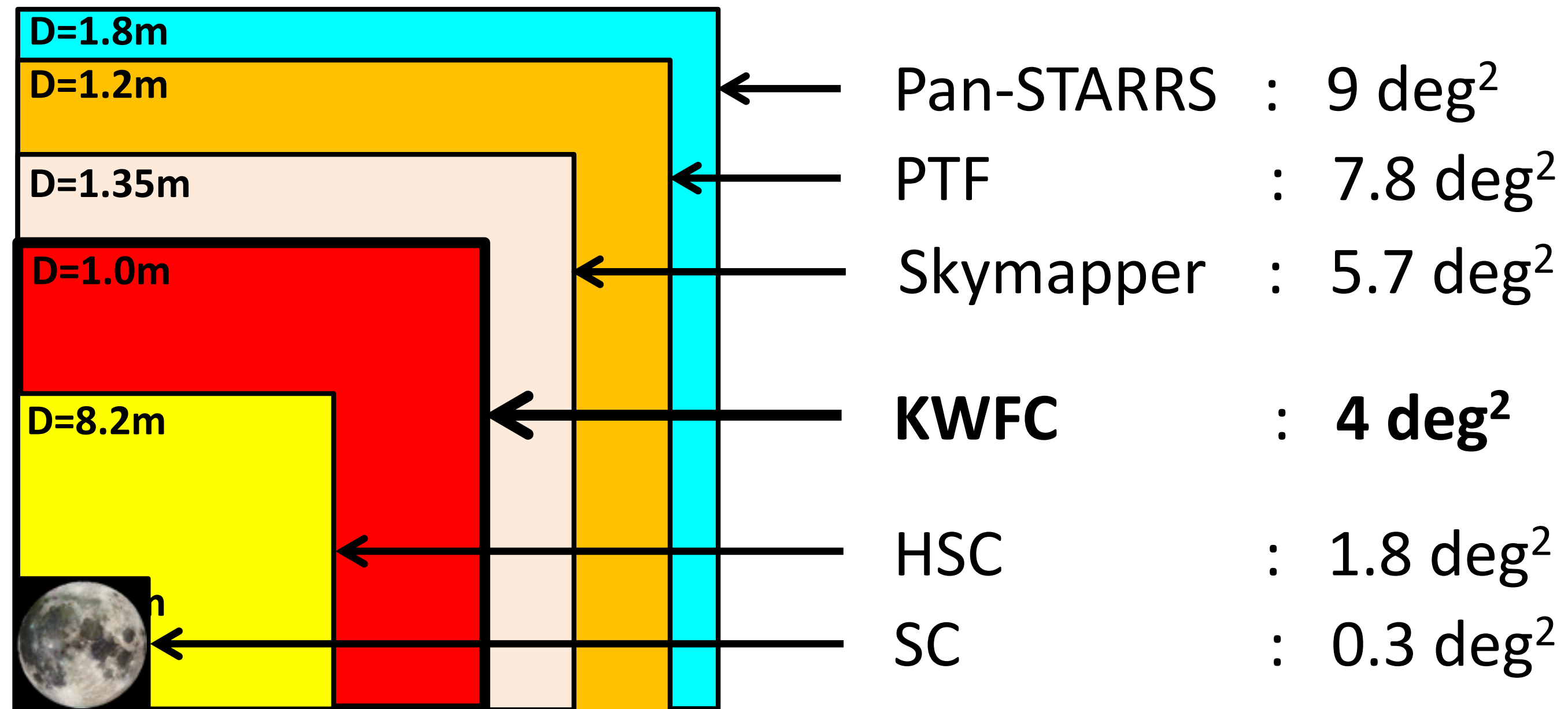
1.05m Schmidt Telescope

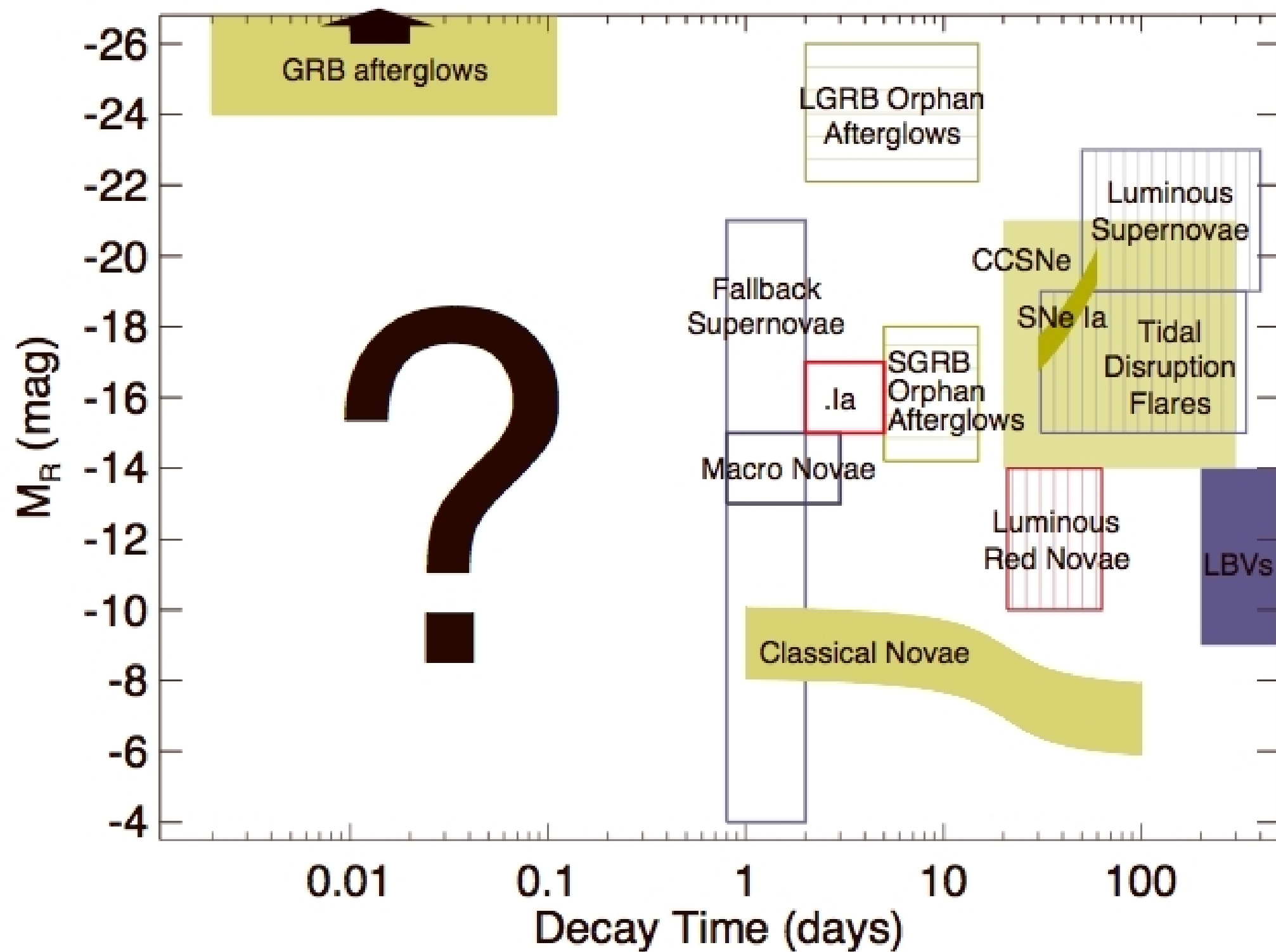


KWFC = Kiso Wide Field Camera

2012 April -
(4k x 2k chip) x 8
1 arcsec/pix

Slide from Shigeyuki Sako





SN shock breakout

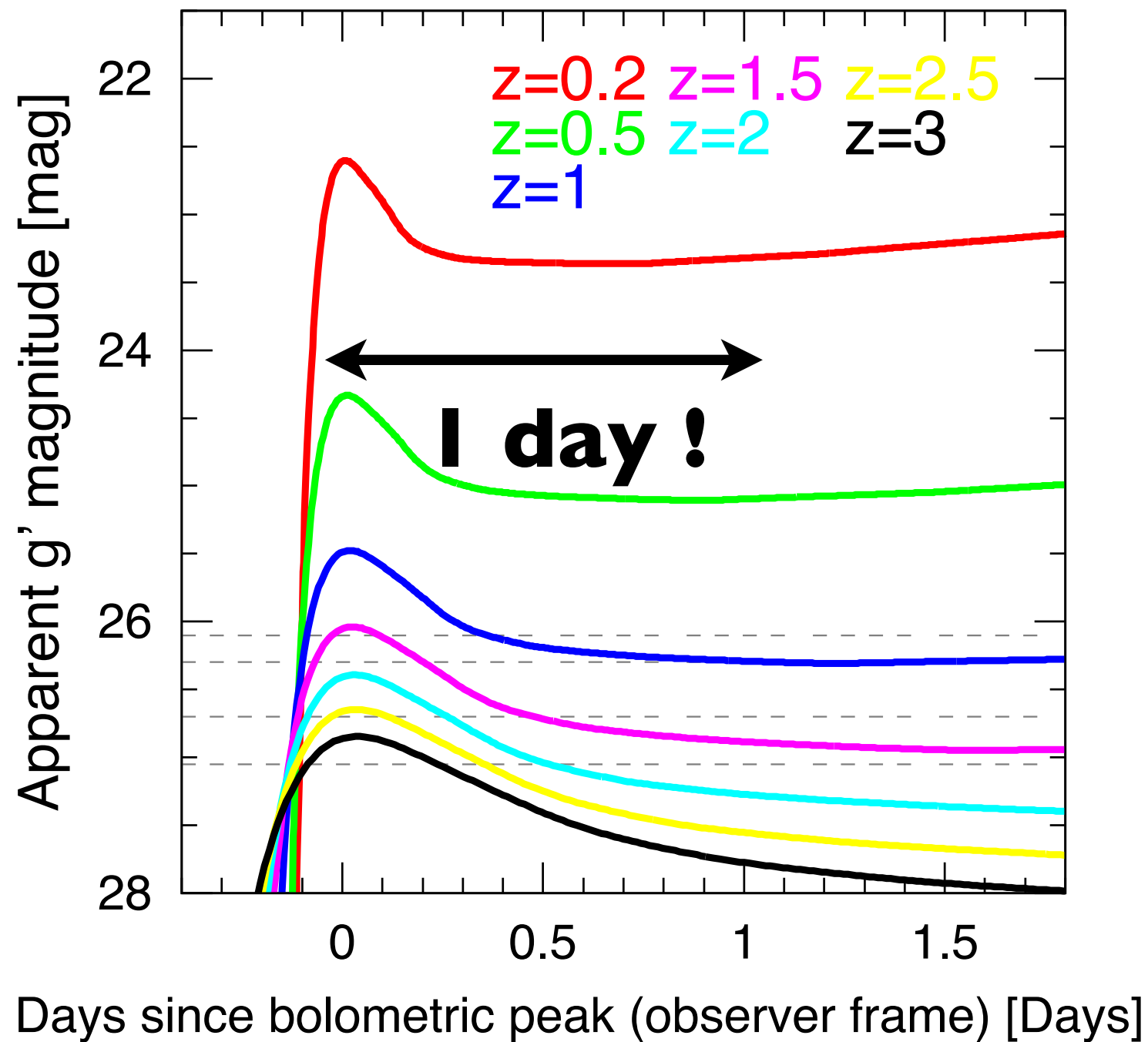


Figure from N. Tominaga

Nozomu's talk

progenitor star



Breakout

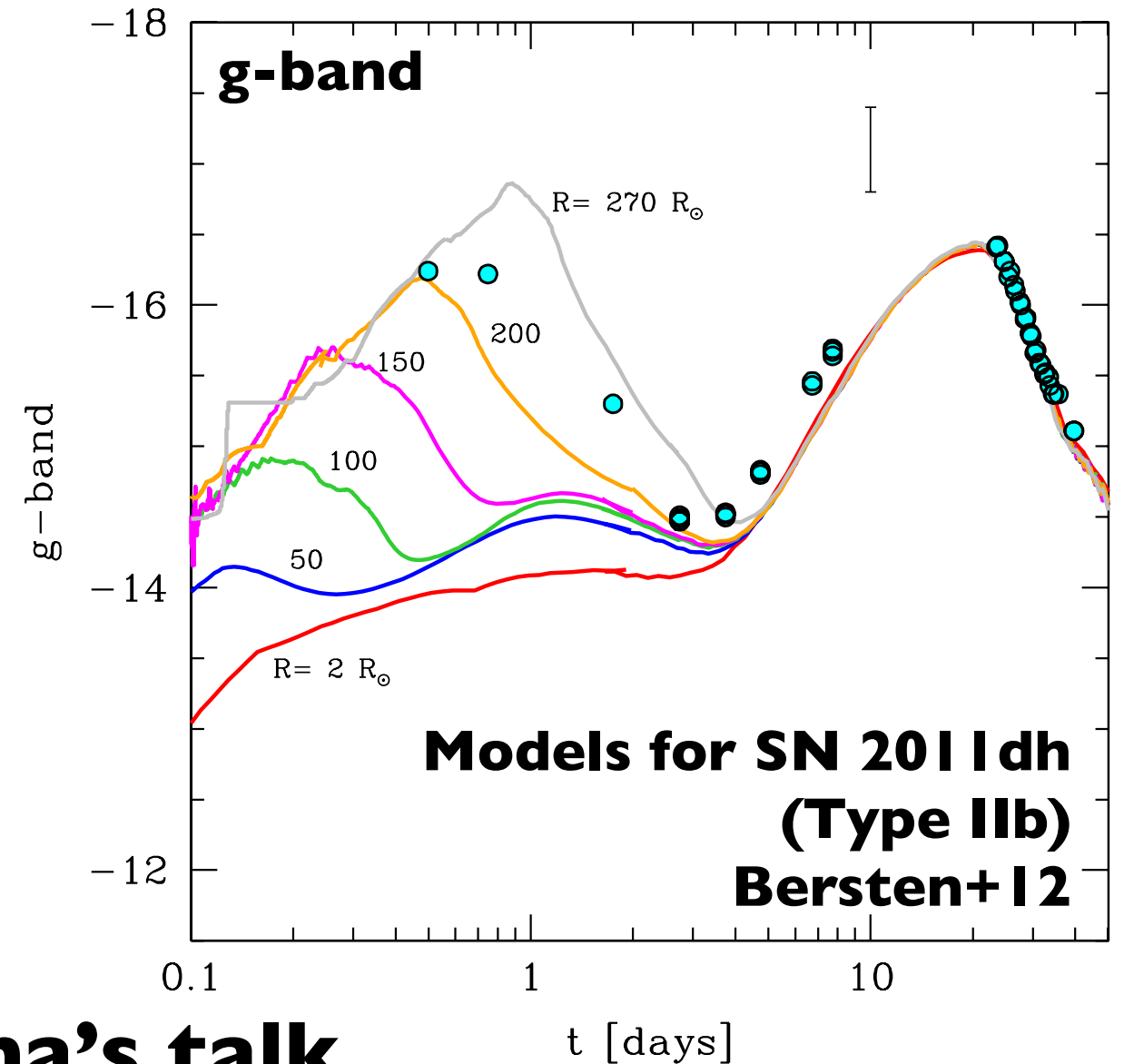
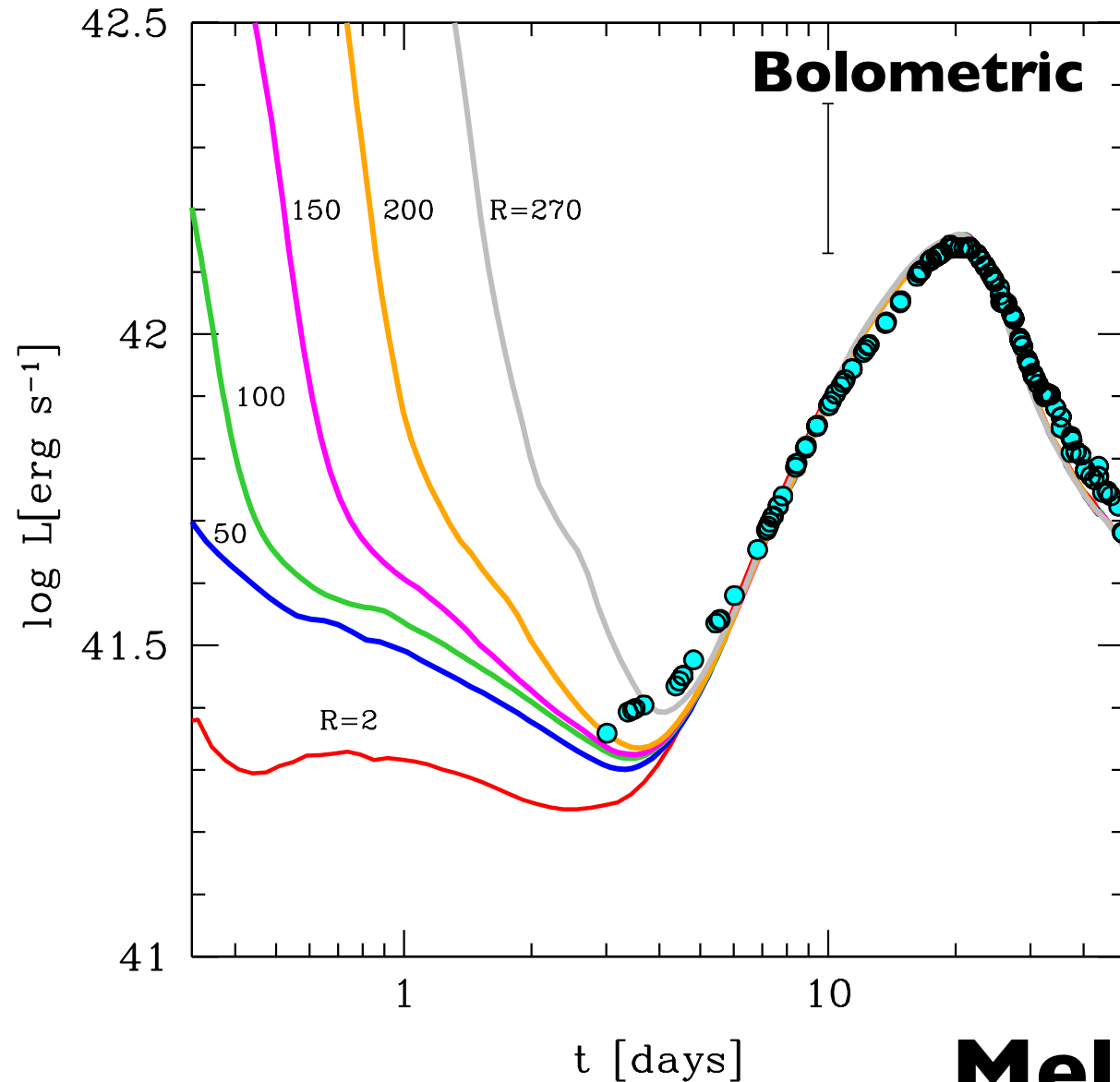


> a few days



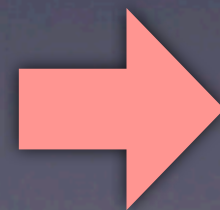
Figure from T. Morokuma

Type IIb SN 2011dh



Melina's talk

It's too late with
classical 2-3 days cadence



**High-Cadence
SN Survey**

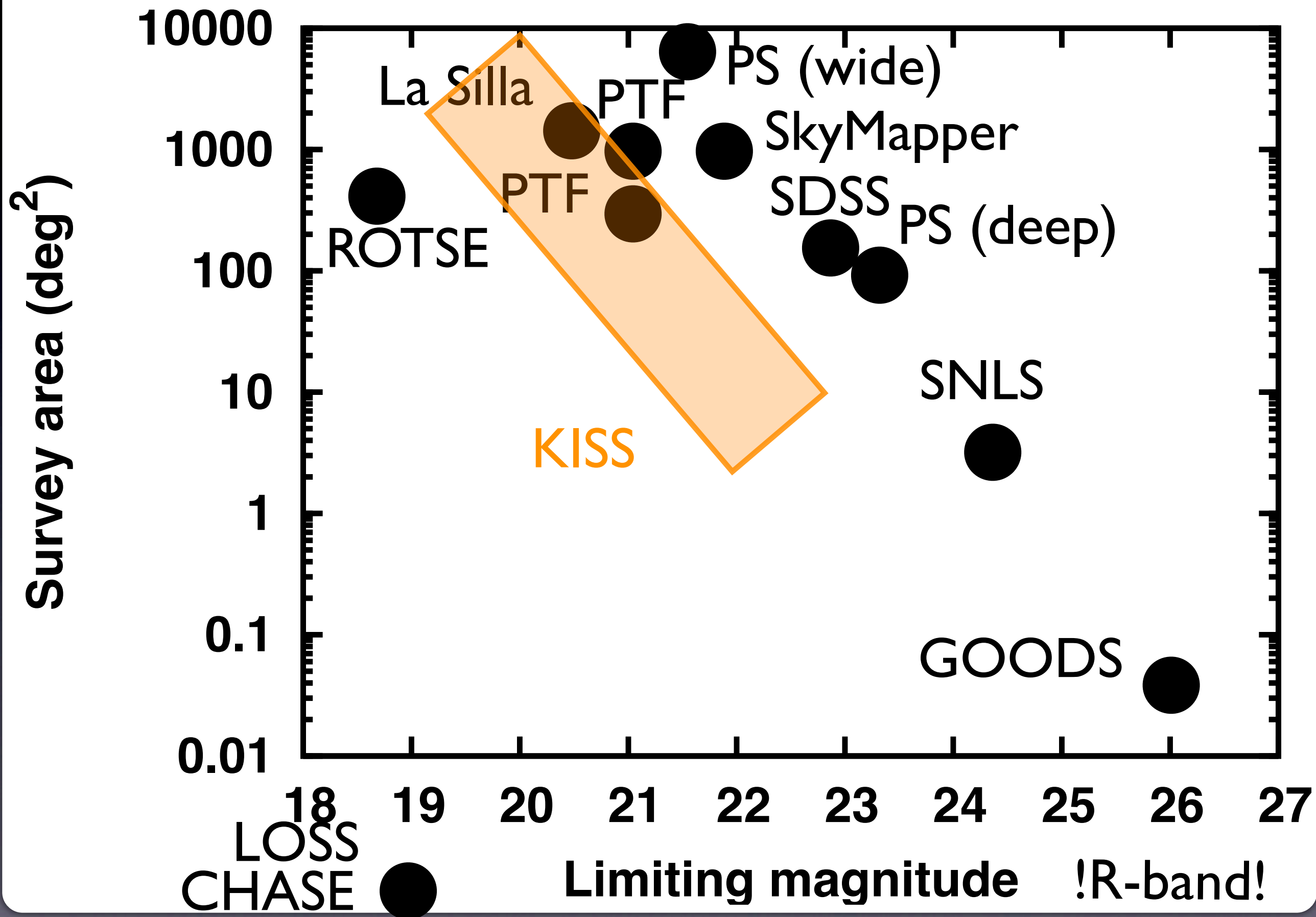
KISS: Kiso **S**upernova **S**urvey

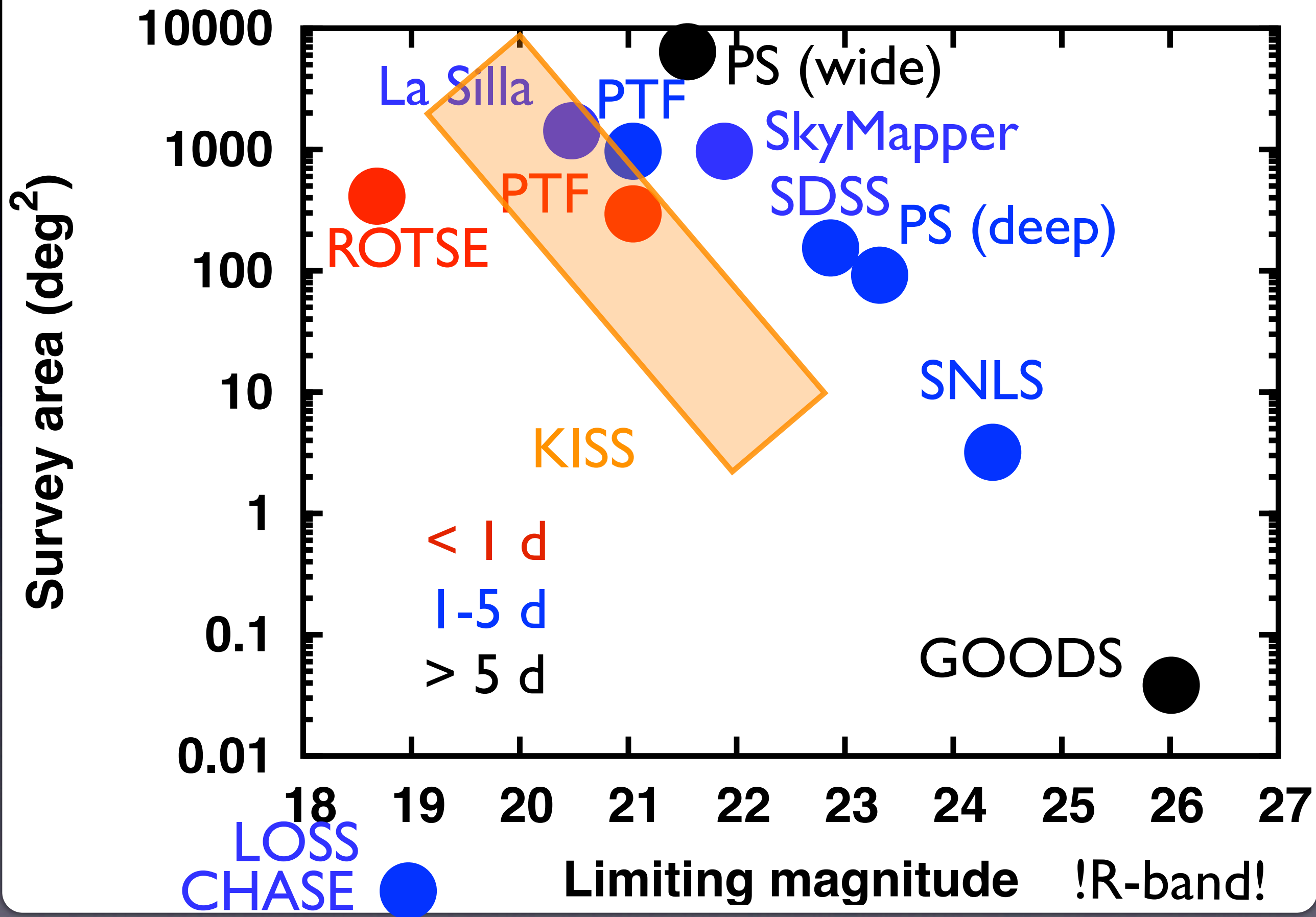
- **Extremely high cadence**
 - **1-hr cadence**
 - **3 min exposure**
 - **~ 21 mag in g-band**
 - **~50-100 deg² /day**
 - **High SFR field (within $z=0.05$, 30-100 Msun/yr)**

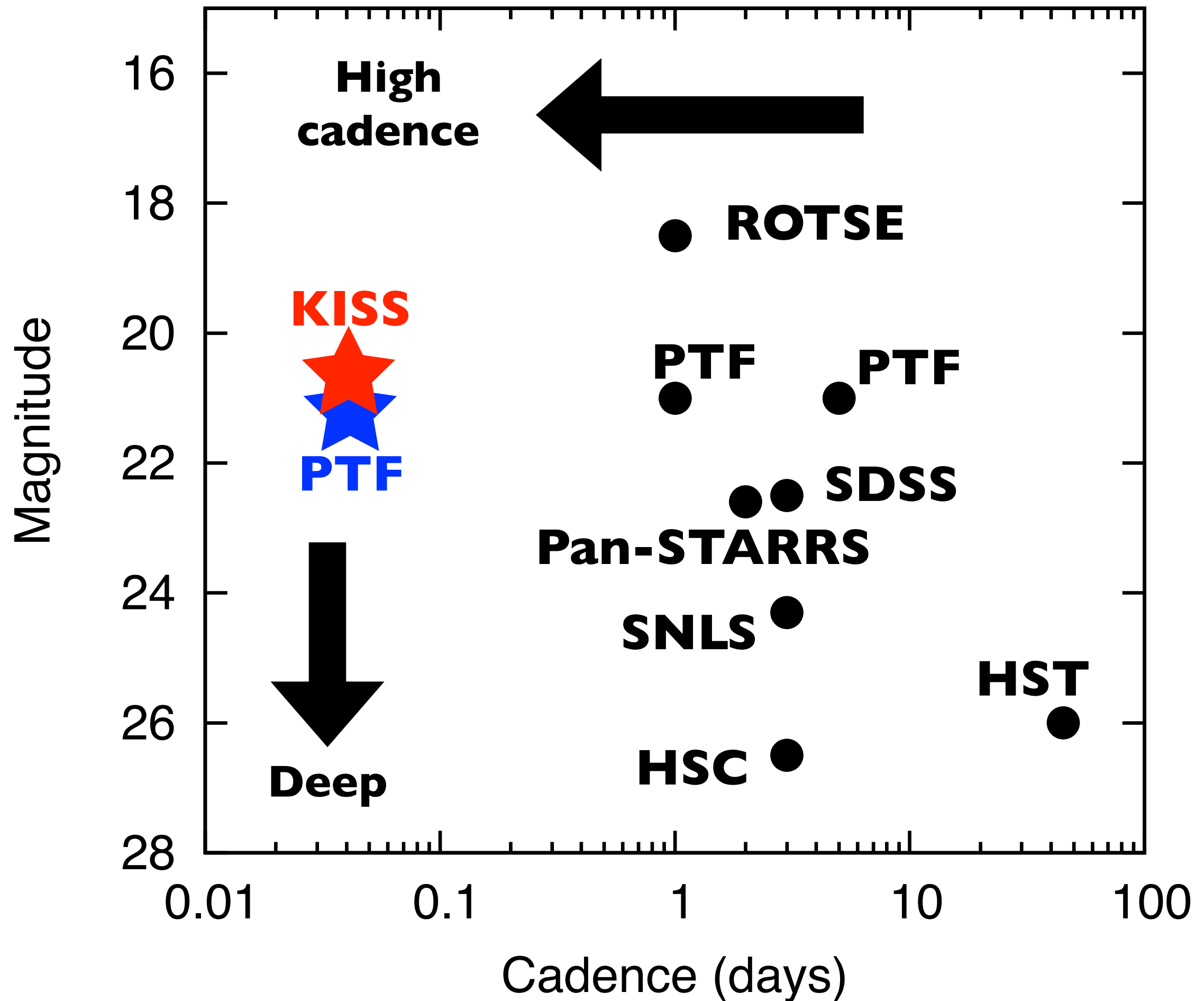
PI: Tomoki Morokuma (Univ. Tokyo)

2012 Apr: Dry run -

2012 Sep: Main survey -





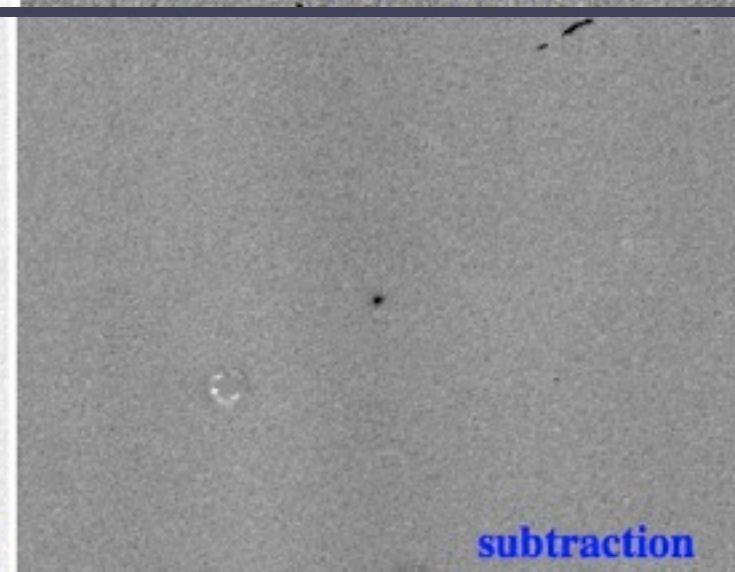
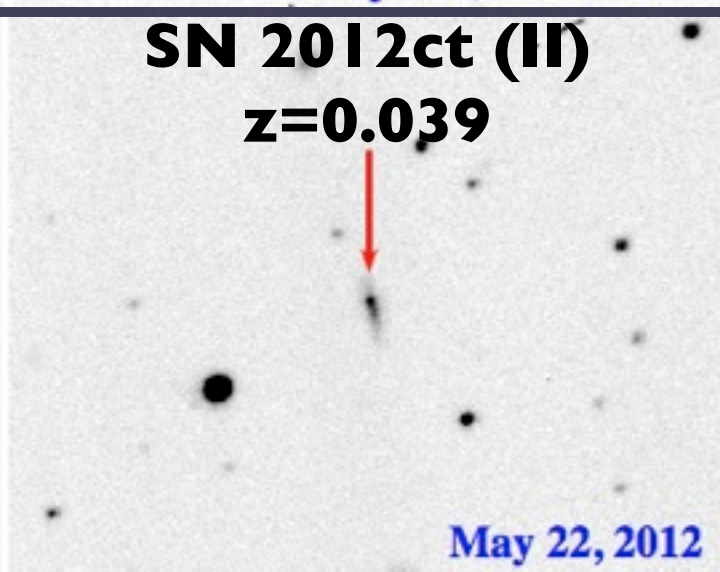
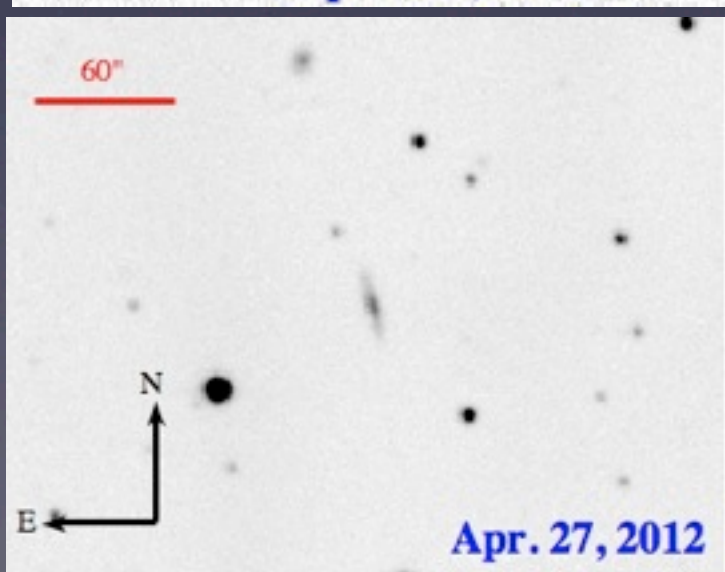
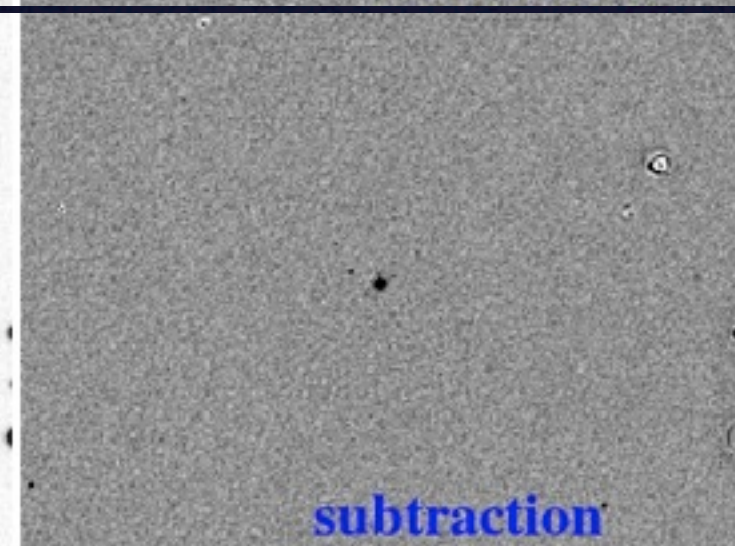
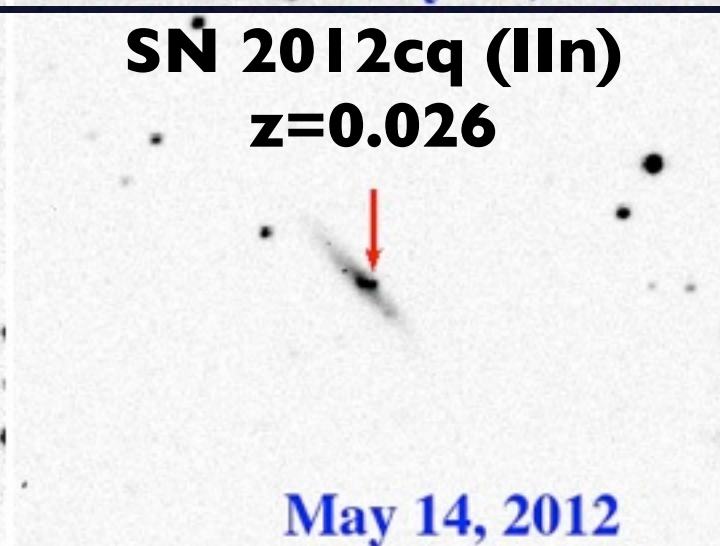
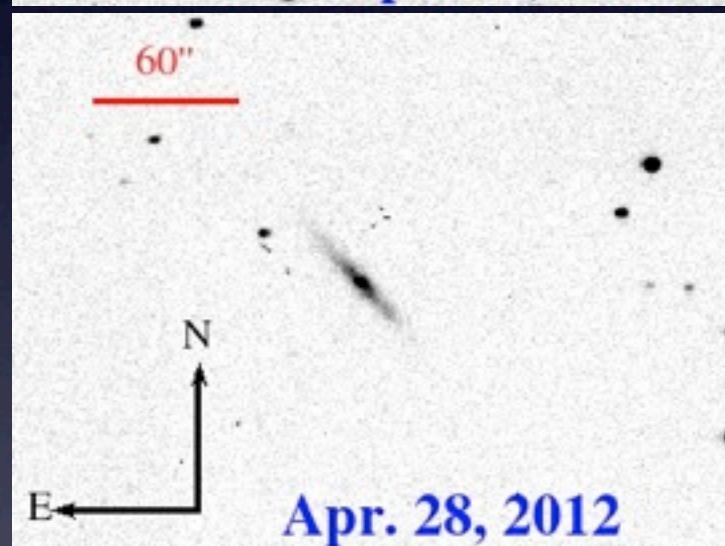
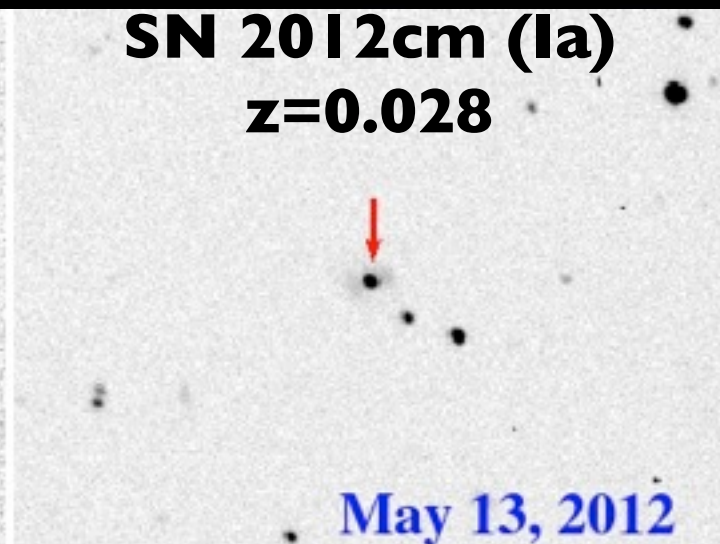
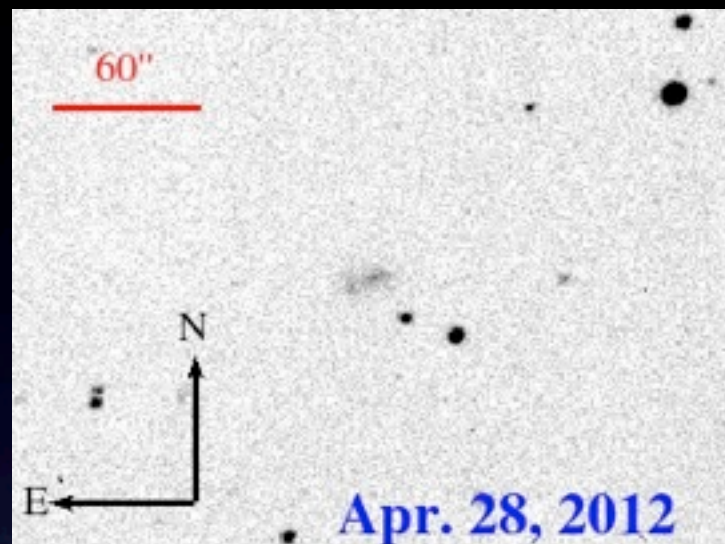


First KISS!

Reference

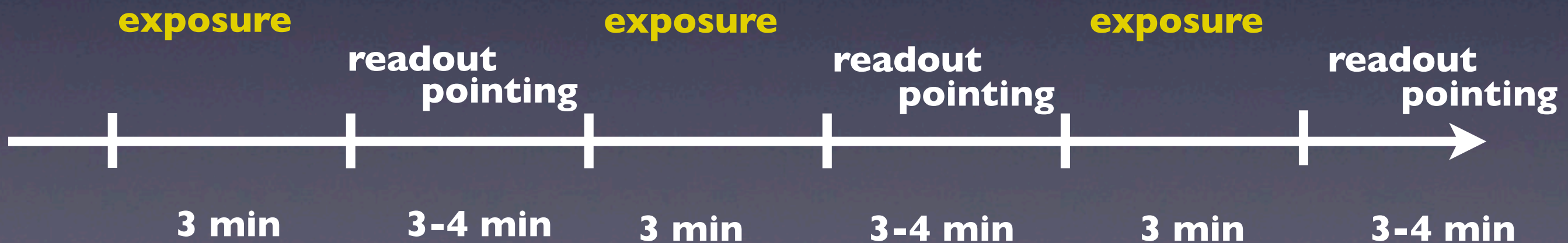
New

Subtracted



Operation

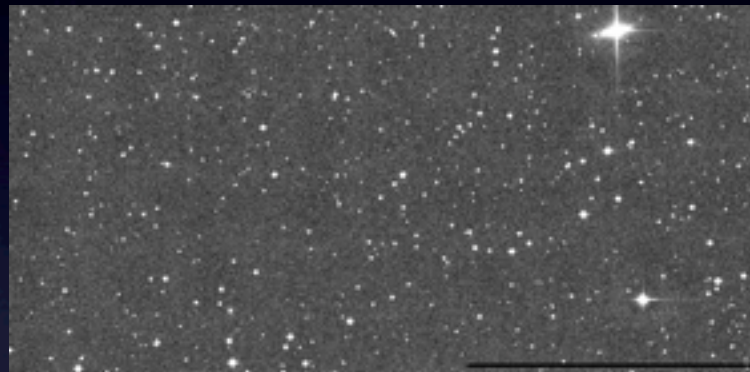
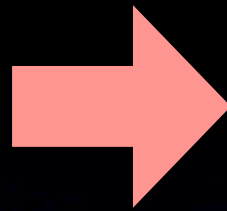
- ~ 100 nights / yr (around new moon)
Intensive program at Kiso observatory (3 yr)
- 30-40% good weather
- 3 arcsec seeing
- half-automatic observations
(someone should be at the observatory)



Kiso observatory



KISS pipeline



standard reduction

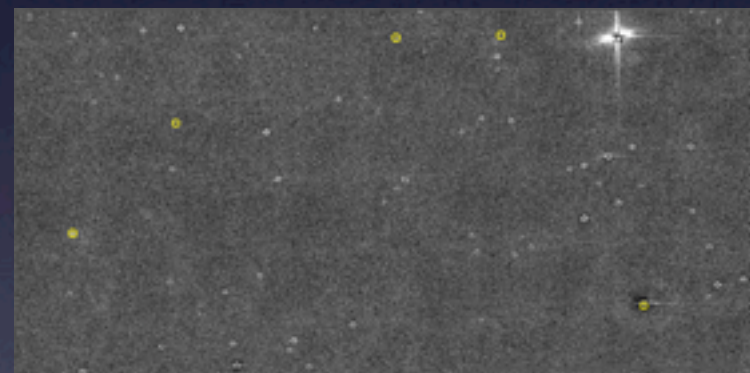


image subtraction

source detection

< 10 min
~ 50GB/day

cut-out images

Ref

New

Sub

KISS database

**source
info**

Tokyo

cut-out images

Ref

New

Sub


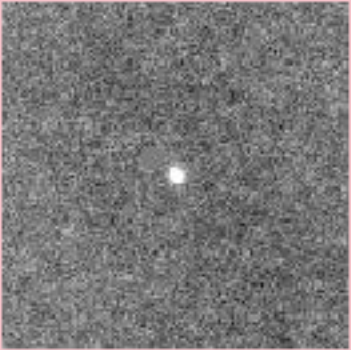
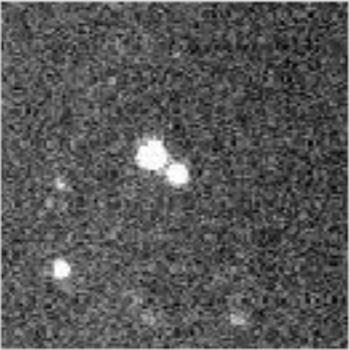
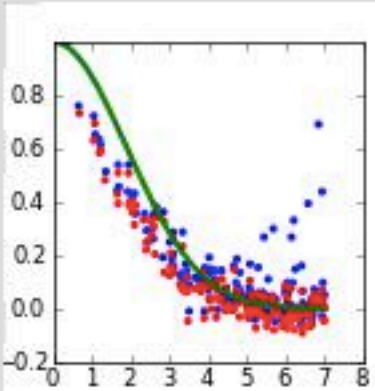

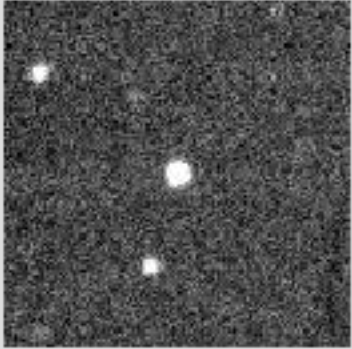
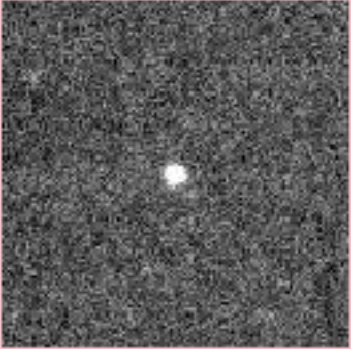
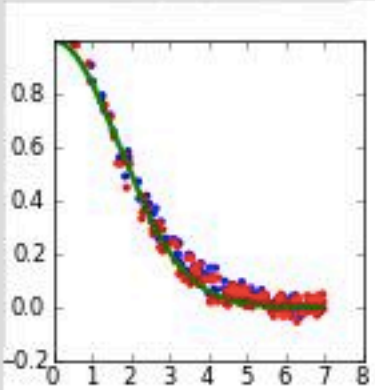
KISS database

**source
info**

KISS interface



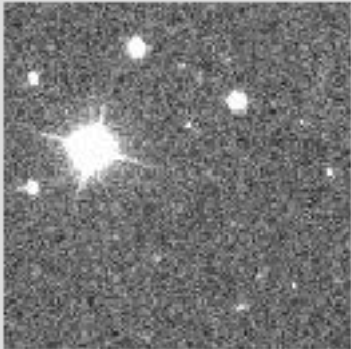
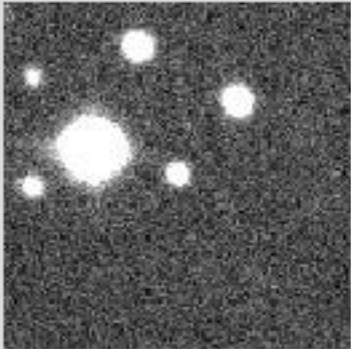
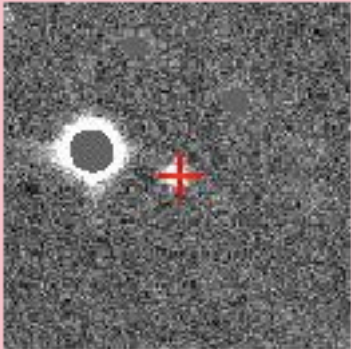
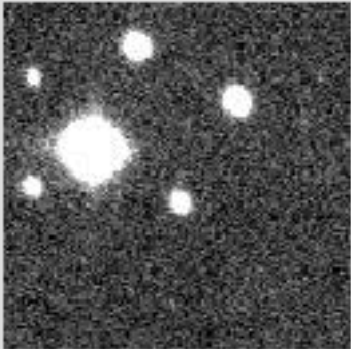
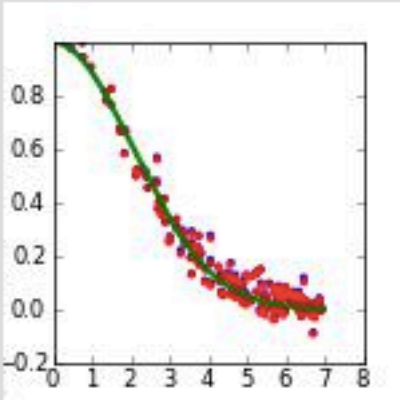
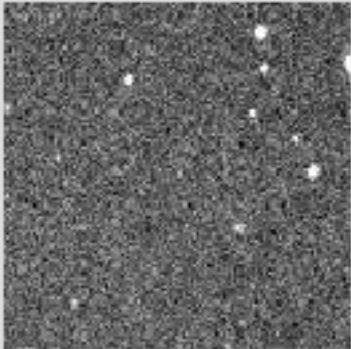
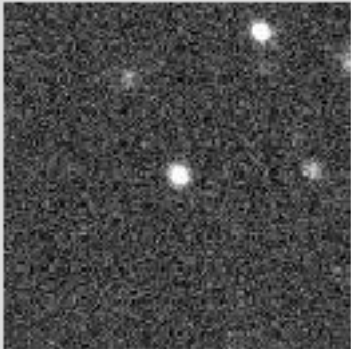
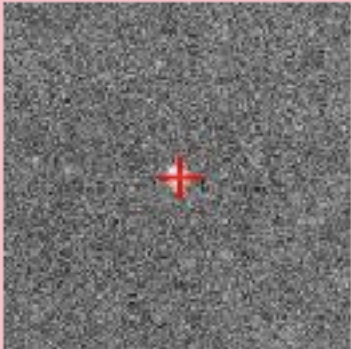
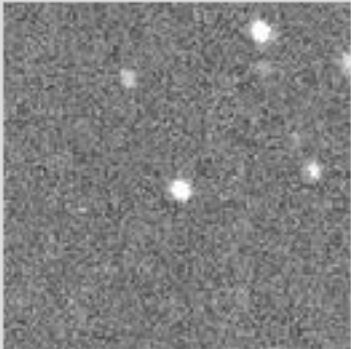
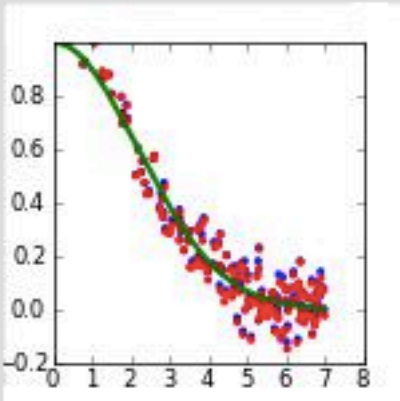
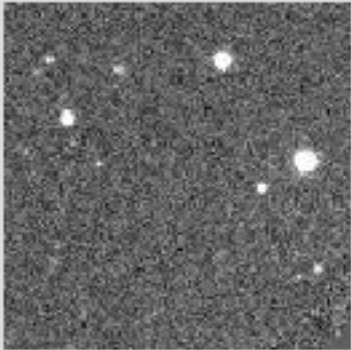
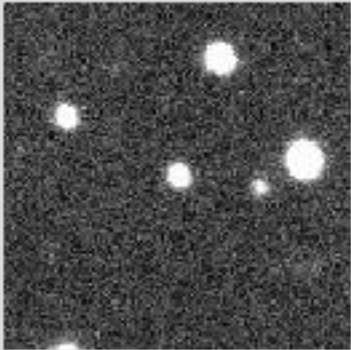
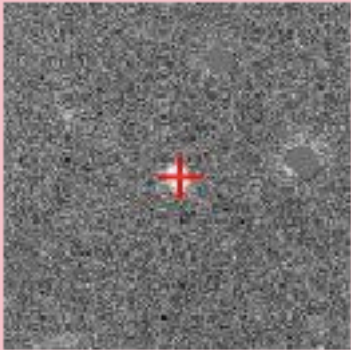
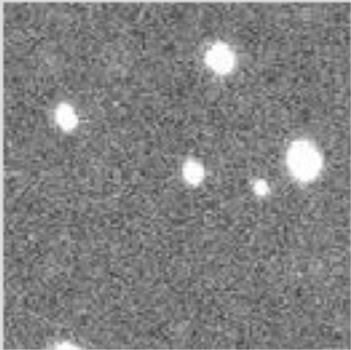
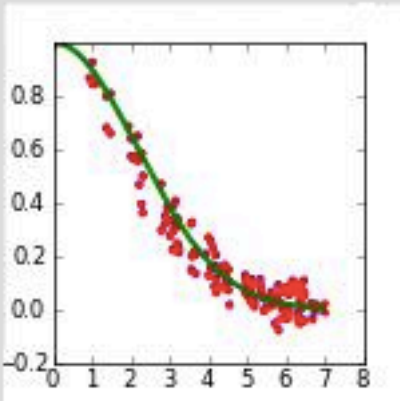
Realtime check
Amateur astronomers

No	Request	FitsID	Reference	New	Subtracted	Previous	Profile
			(2' x 2')	(2' x 2')	(2' x 2')	(2' x 2')	7pix
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	<input type="button" value="unbookmark"/>	<div>score</div> <div>0 <input type="button" value="1"/> <input checked="" type="button" value="2"/></div>					
2	source ID 669258 <input type="button" value="submit"/>	2012-11-18 KSFJ0804+4030 0022404_0 KISS12r					<div>new sub</div> 
	<input type="button" value="bookmark"/>	<div>score</div> <div>0 <input type="button" value="1"/> <input checked="" type="button" value="2"/></div>					



Realtime check
by KISS members and
amateur astronomers in Japan


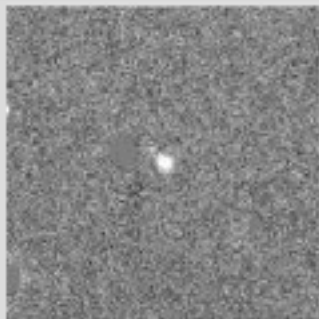


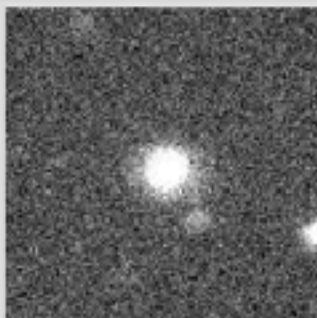
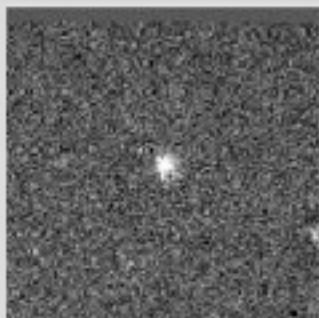

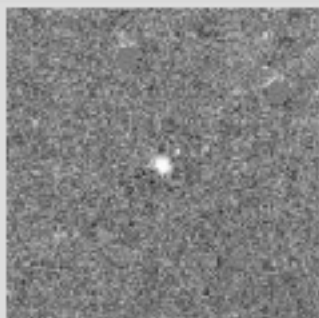


Most common sources...

No	Request	FitsID	Reference (2' x 2')	New (2' x 2')	Subtracted (2' x 2')	Previous (2' x 2')	Profile 7pix
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	<input type="button" value="bookmark"/>	score 0 1 2					
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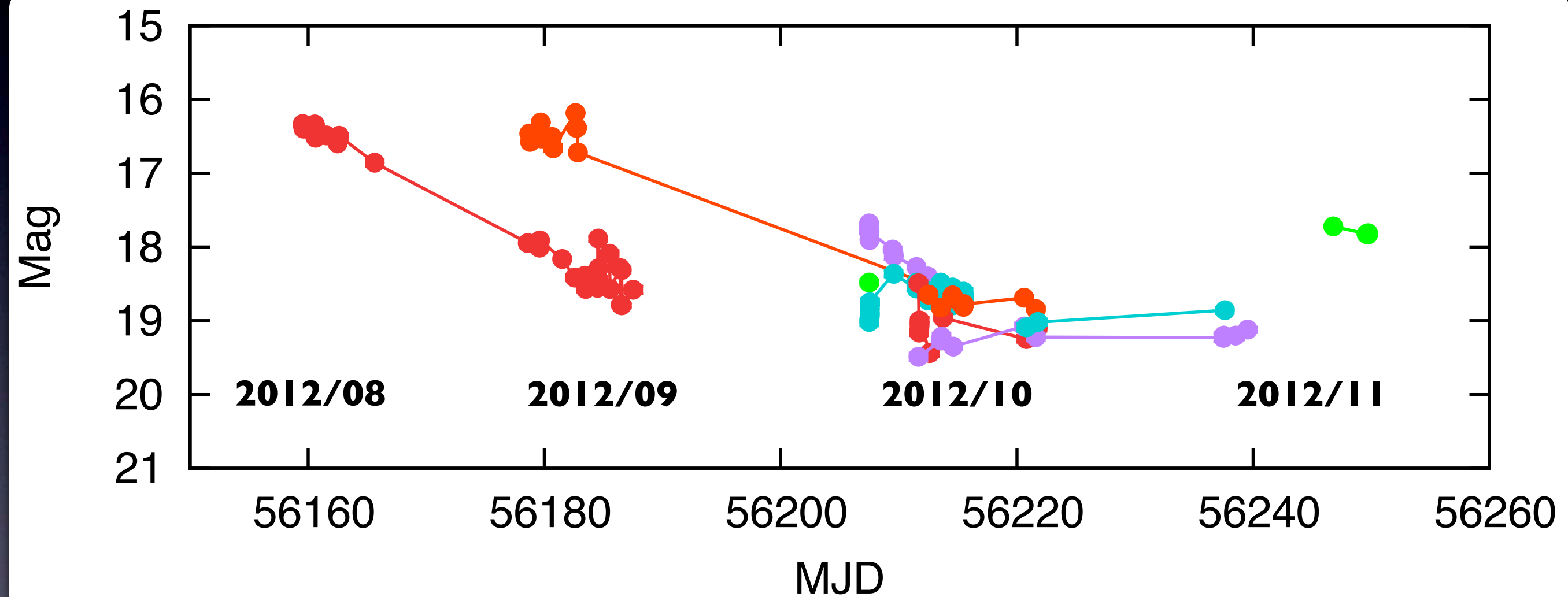
Thanks to Francisco!

18 SNe (and SN candidates) so far

KISS Supernova List

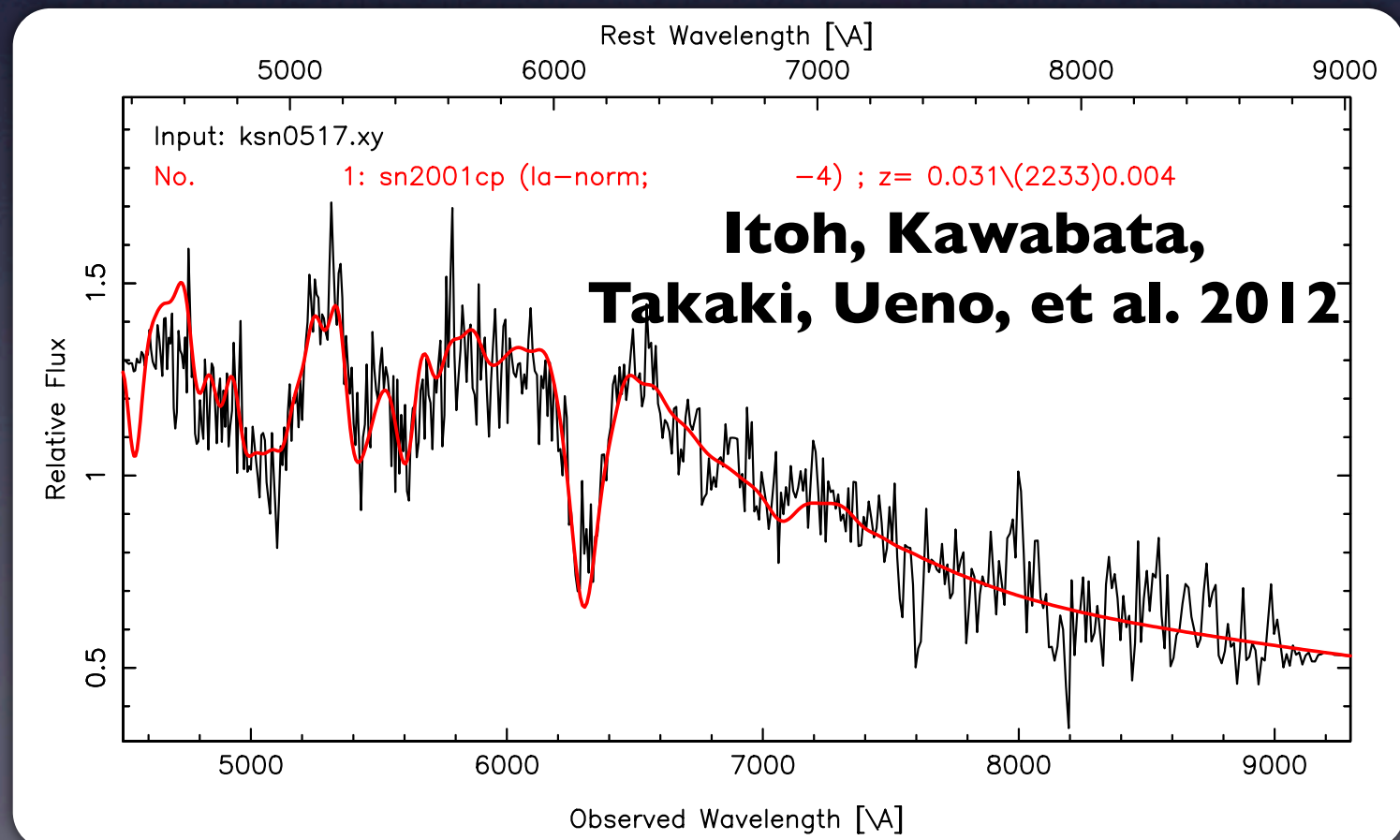
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submit	KISS12p	2012-10-13			01:27:14.62	+00:52:24.9	
submit	KISS12o	2012-10-12			23:49:05.45	+00:22:54.9	
submit	KISS12n	2012-10-11			03:16:31.53	-00:28:03.3	LSQ12fhh II
submit	KISS12m	2012-10-07			23:43:34.40	+00:34:07.3	PTF12izc Ia

Light curves



Follow-up

- 1-2m telescopes in Japan
(Masayuki's and Katsutoshi's talk)
- 1m mini-TAO at Chile
- 2m HCT (D. K. Sahu, G. C. Anupama)
- 3.6m TNG (E. Walker, E. Pian, P. A. Mazzali)
- Under discussion



Initial Results (half a year)

- **18 SN candidates**
(consistent with expectation)
- **3 IAU SNe**
- **3 overlap with PTF,**
2 with La-Silla QUEST, 2 with CRTS
- **No shock breakout candidates**
(Last non-detection epoch is usually
2 days - 2 weeks ago)
- **Other variable sources**
 - **Rapid flare (with ~ 1 hr duration)**
 - **AGNs, variable stars**

KISS: Kiso **S**upernova **S**urvey

- **Extremely high-cadence survey**

- **1-hr cadence**

- **3 min exposure**

- **~ 21 mag in g-band**

- **~50-100 deg² /day**

- **100 nights /year**

- **Initial results**

- **18 SN candidates,
but no SN shock breakout**



Your suggestions are welcome!

KISS Members

- Tomoki Morokuma (PI) standard pipeline, survey strategy
- Masaomi Tanaka transient pipeline, web interface
- Nozomu Tominaga survey strategy, transient pipeline
- Kensho Mori operation, data analysis
- Noriyuki Matsunaga standard pipeline
- Michael Richmond standard pipeline
- Shigeyuki Sako KWFC
- Nobuharu Ukita operation
- Kiso observatory staff operation, telescope
- KISS collaborators Y.Aoki, H.Akitaya, Y. Ita, R. Itoh, I. Ueno, Y. Urata, T. Urano, S. Okamura, N. Kawai, K. Kawabata, S. Koshida, Y. Saito, T. Sakamoto, K. Takaki, M. Tanaka, A. Tomita, K. Nakata, H. Nakanishi, D. Nogami, T. Minezaki, Y. Moritani, Y. Yatsu
- Amateur astronomers transient finding