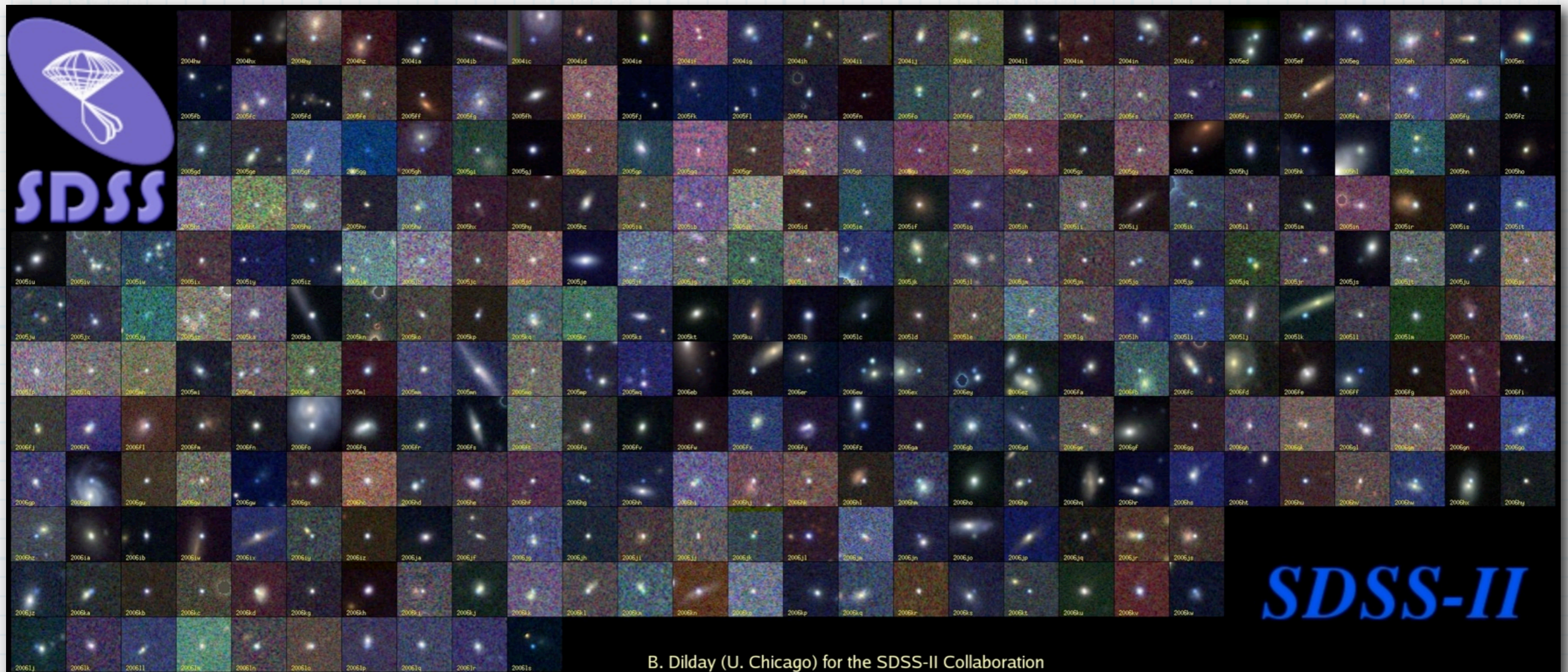


# SDSS-II Supernova Survey: Overview of the 2005 & 2006 seasons

Masao Sako (Penn)

for the SDSS-II Collaboration and SN Spectroscopic Follow-up Teams



B. Dilday (U. Chicago) for the SDSS-II Collaboration

# SDSS-II SN Team

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**Subaru team**

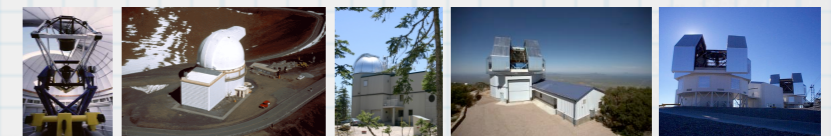
Y. Ihara

**KPNO team**

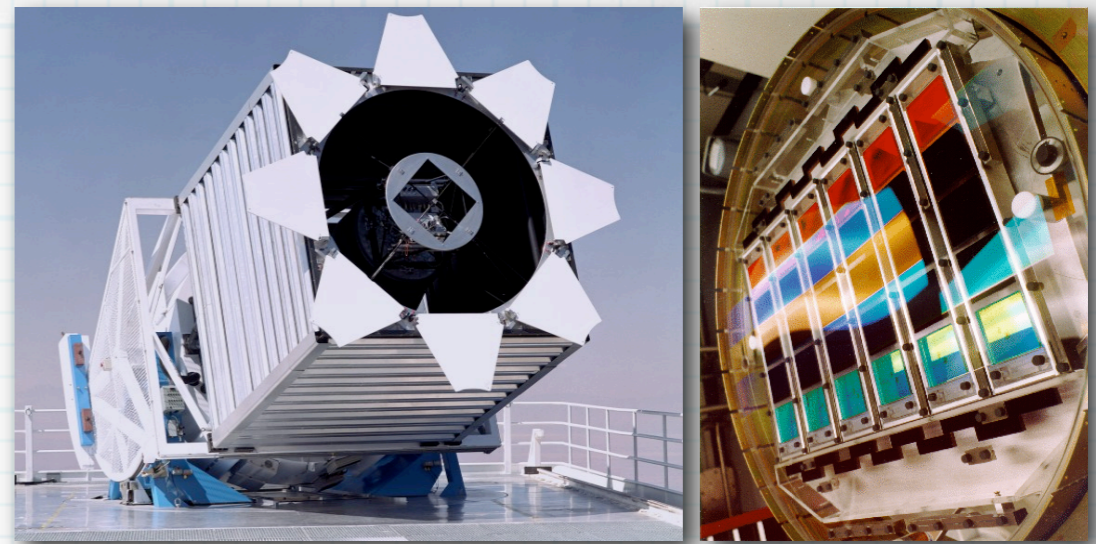
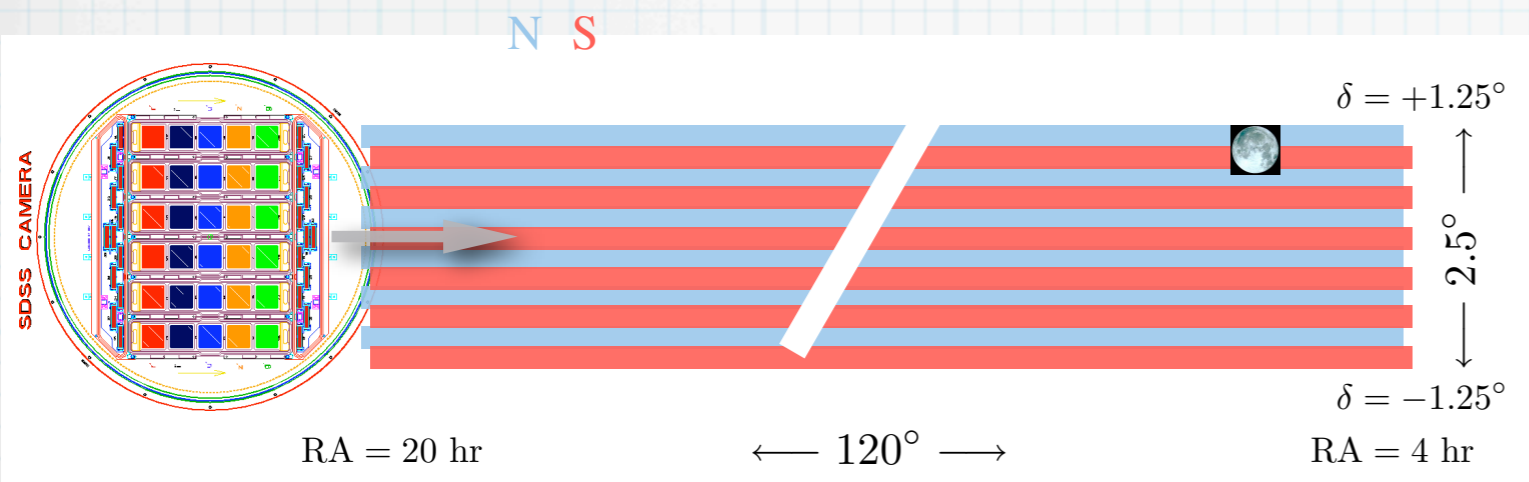
M. Florack, A. Hirschauer, D. O'Connor

**Keck team**

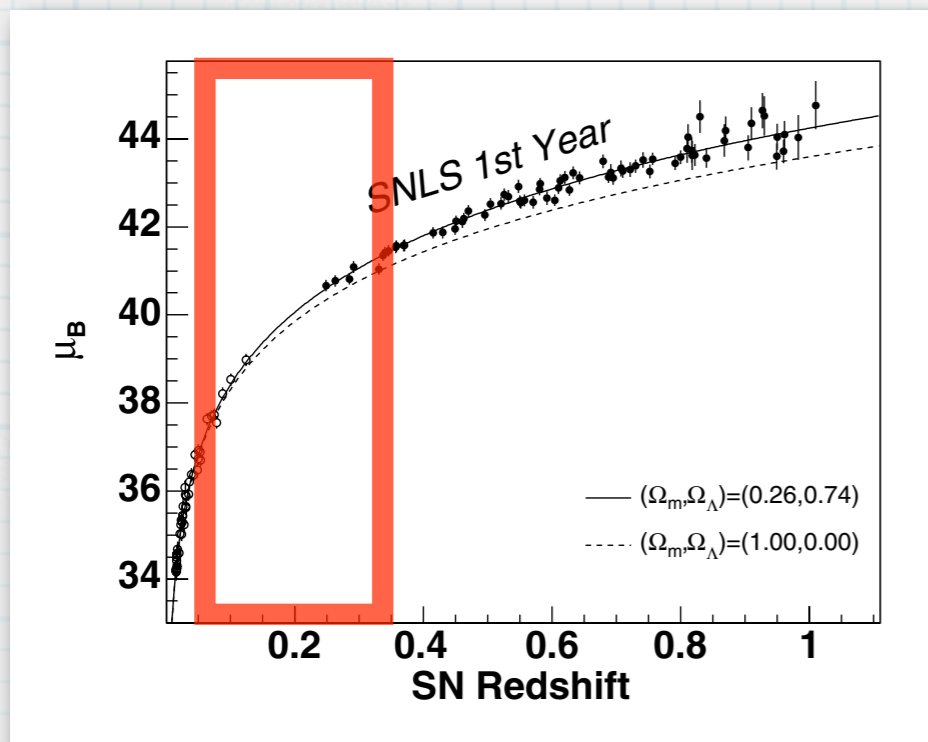
R. Foley, A. Filippenko



# SDSS-II Survey Strategy



- **280 deg<sup>2</sup>** every **2 days** during Sept 1 - Nov 30 of 2005/6/7.
- multi-band light curves of SN Ia at  **$0.05 < z < 0.35$**

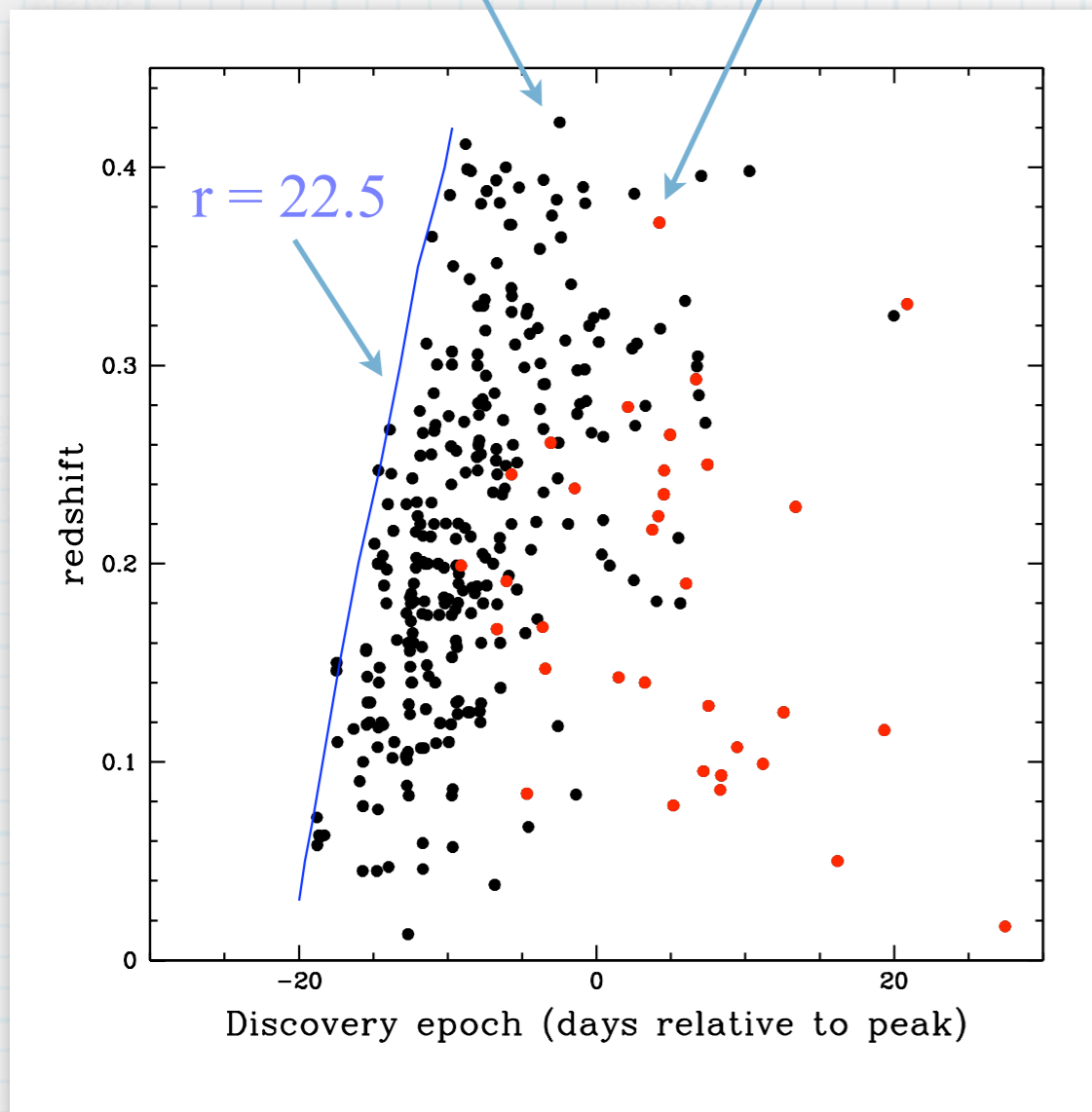


- On-mountain 24 hr processing
- SN candidates released immediately to public.
- real-time photometric typing.
- spectroscopic follow-up.

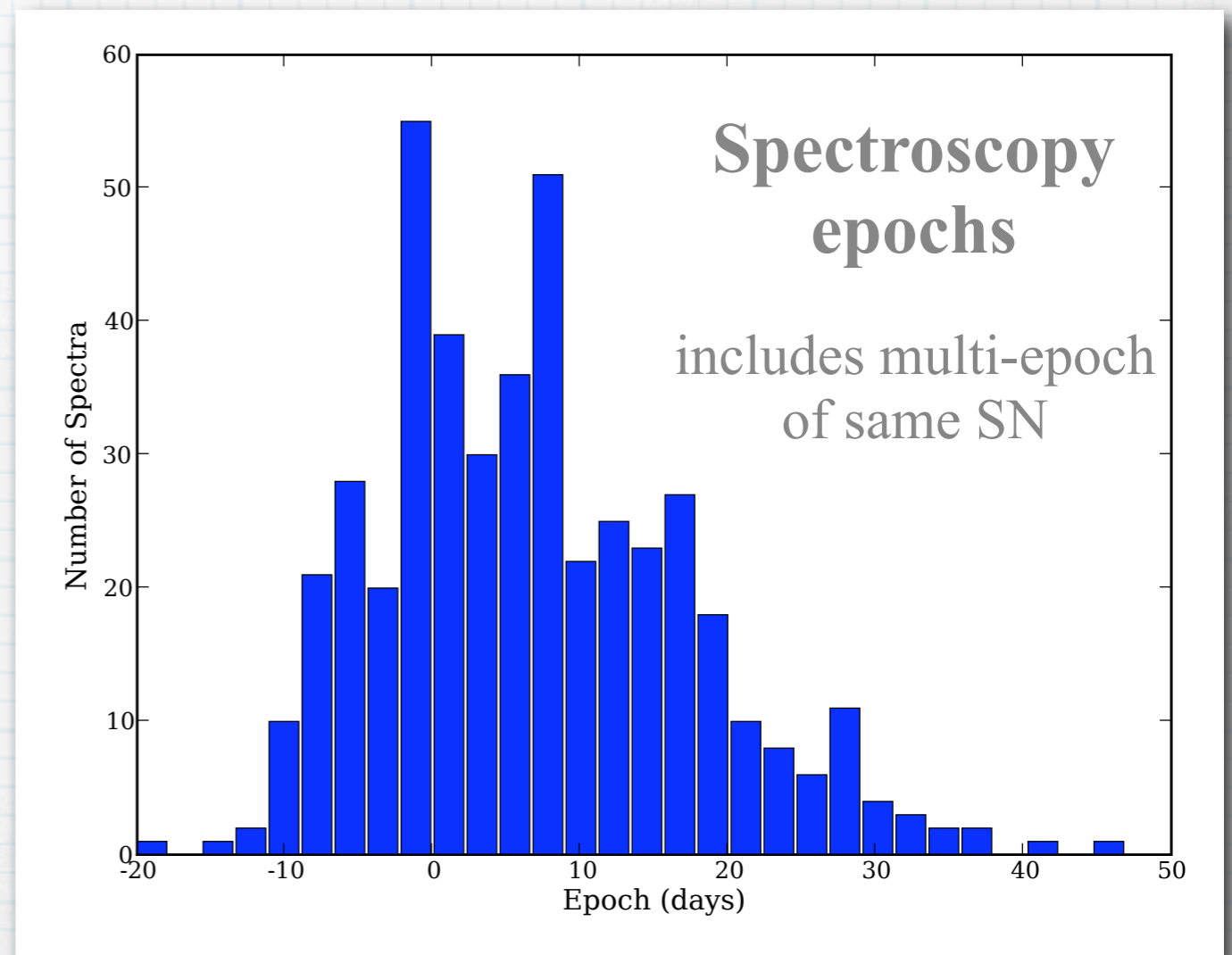
# 2005 & 2006 Seasons

peaked after  
Sept. 7

peaked before  
Sept. 7



Follow-up spectrum usually  
obtained after  $\sim 2 - 4$  epochs  
( $\sim 90\%$  confirmation efficiency for SN Ia).



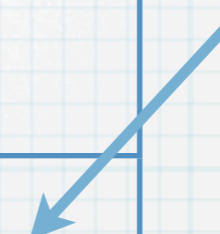
Frieman et al. (2007)

$> 85\%$  of SN Ia discovered  
before maximum light

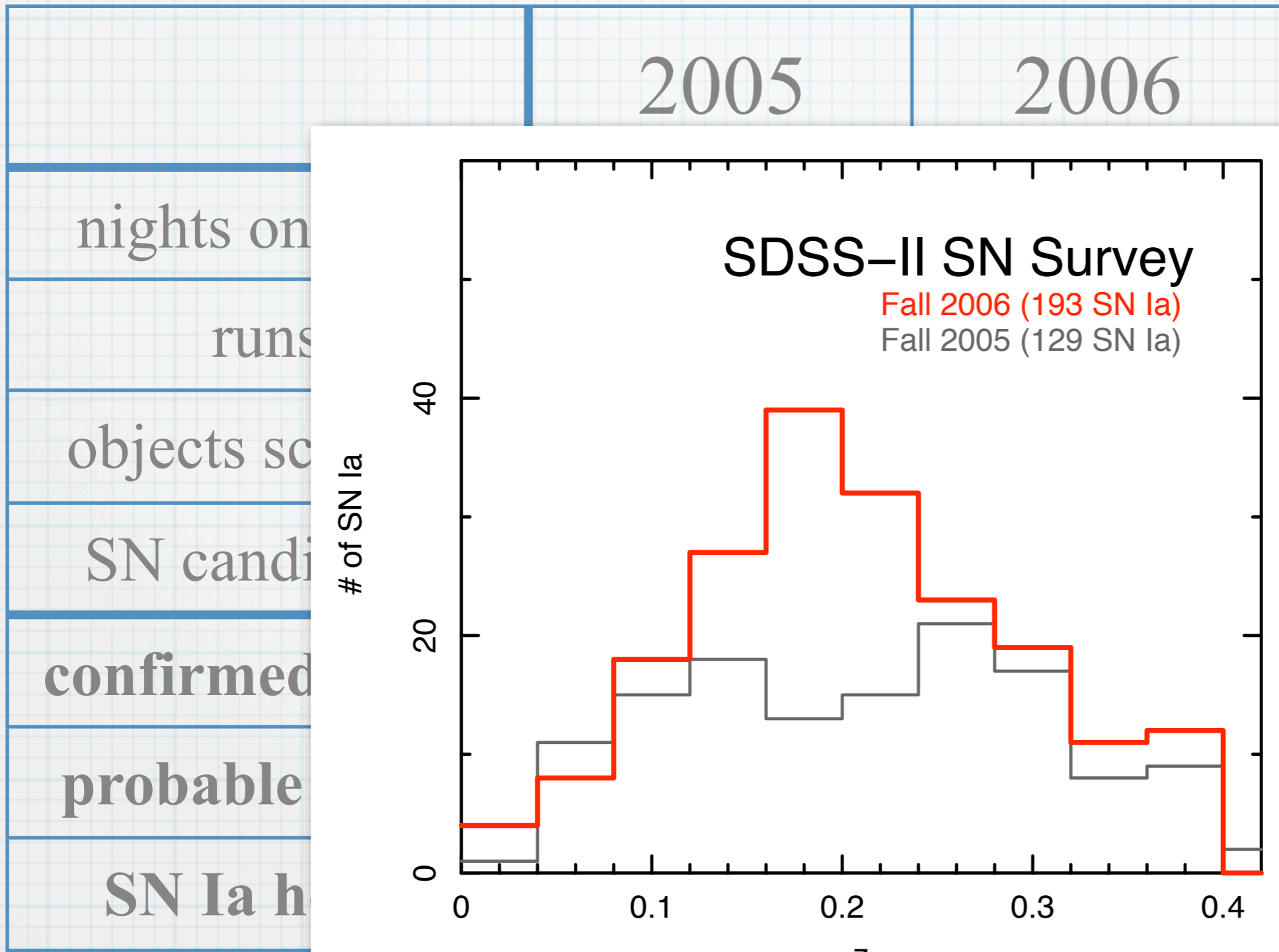
also attempted **20 single-epoch** candidates  
(**15 SNe**, **1 galaxy**, **2 noise**, **2 asteroids**)

	2005	2006
nights on 2.5m	59	60
runs	73	90
objects scanned	190,020	14,441
SN candidates	11,385	3694
<b>confirmed SN Ia</b>	<b>129</b>	<b>193</b>
<b>probable SN Ia</b>	<b>16</b>	<b>15</b>
<b>SN Ia host z</b>	<b>80</b>	<b>14</b>

improved junk filter  
trained with 2005  
data & scan 2nd-  
epoch and bright  
1st-epoch objects

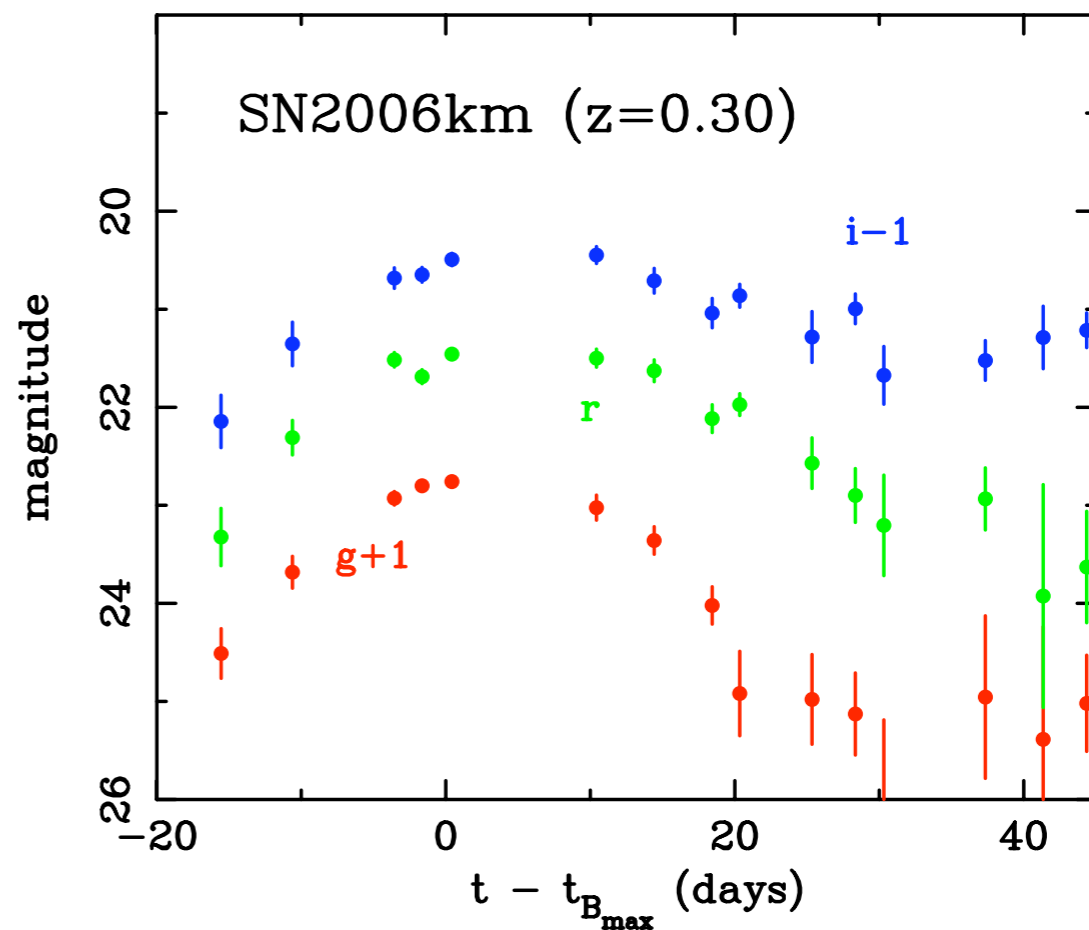
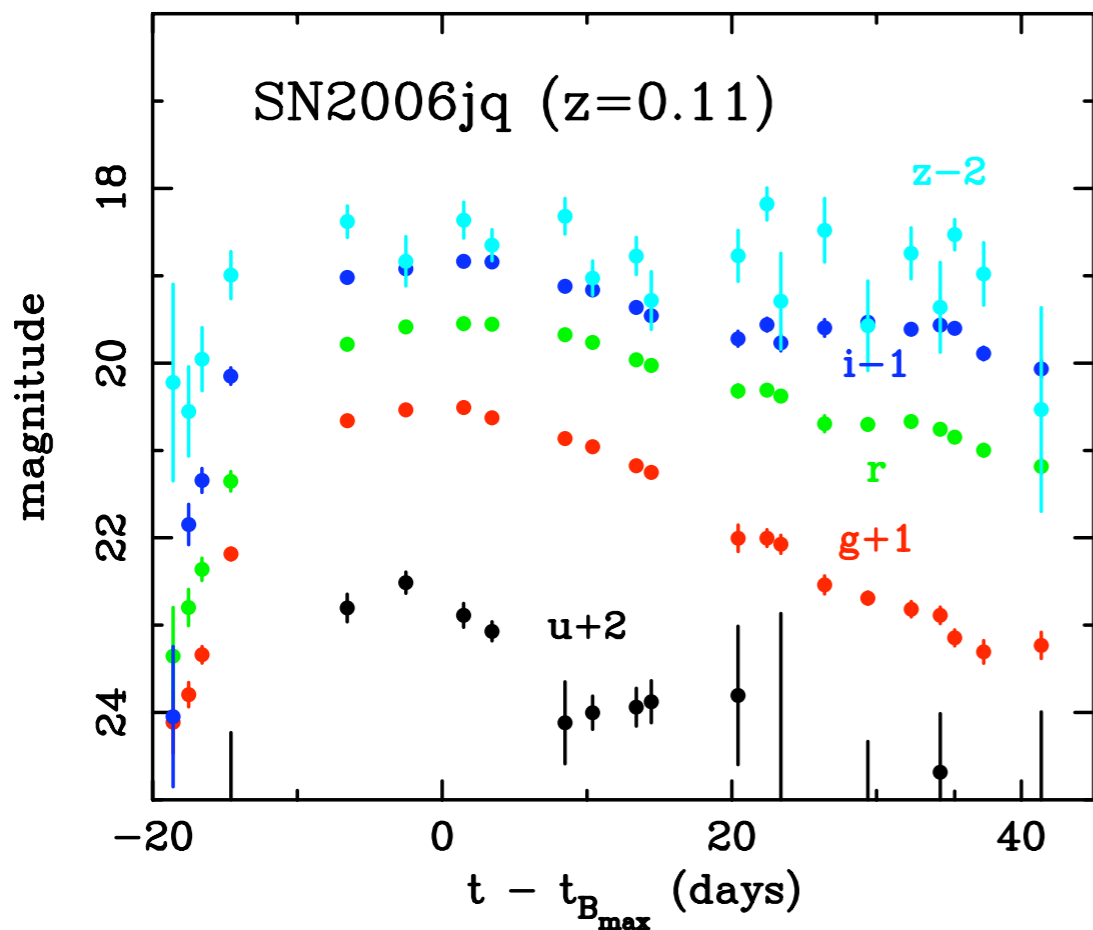
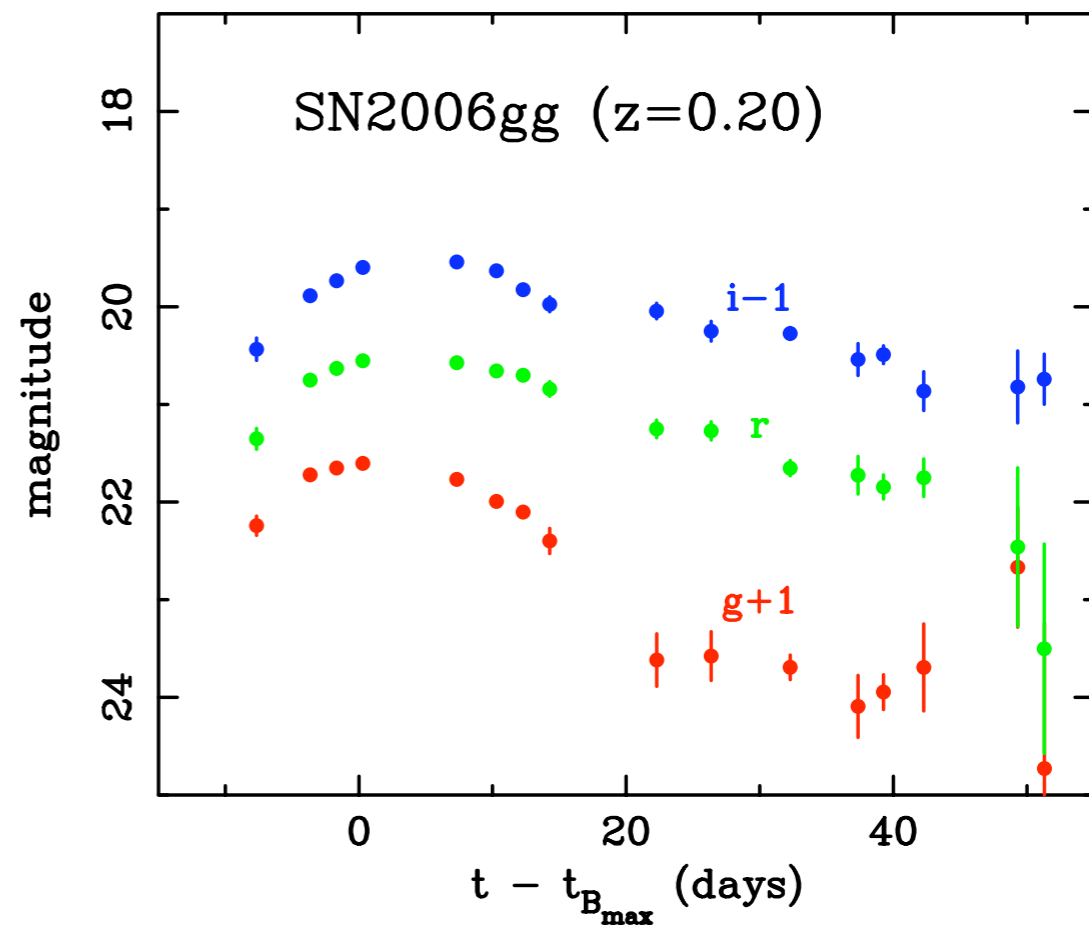
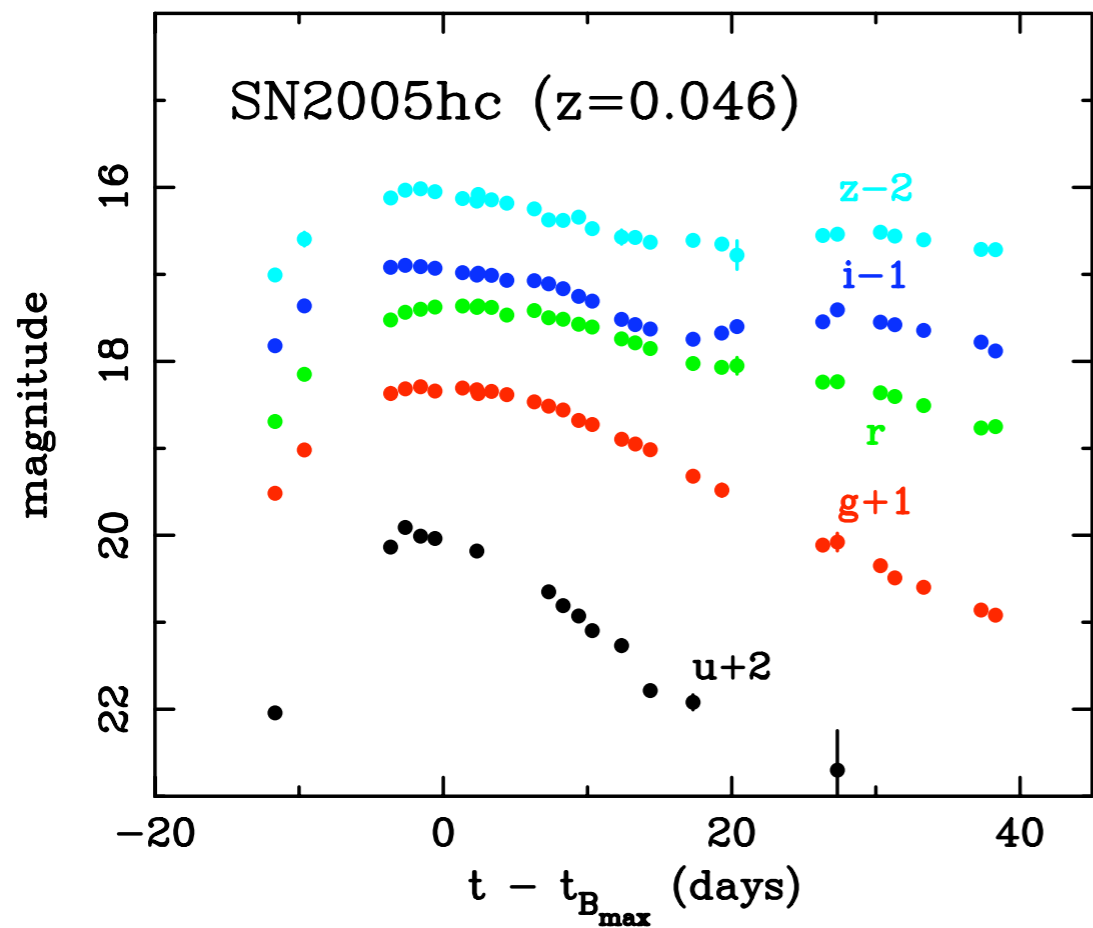


**322 SN Ia + 44 CC SNe in 6 months.**



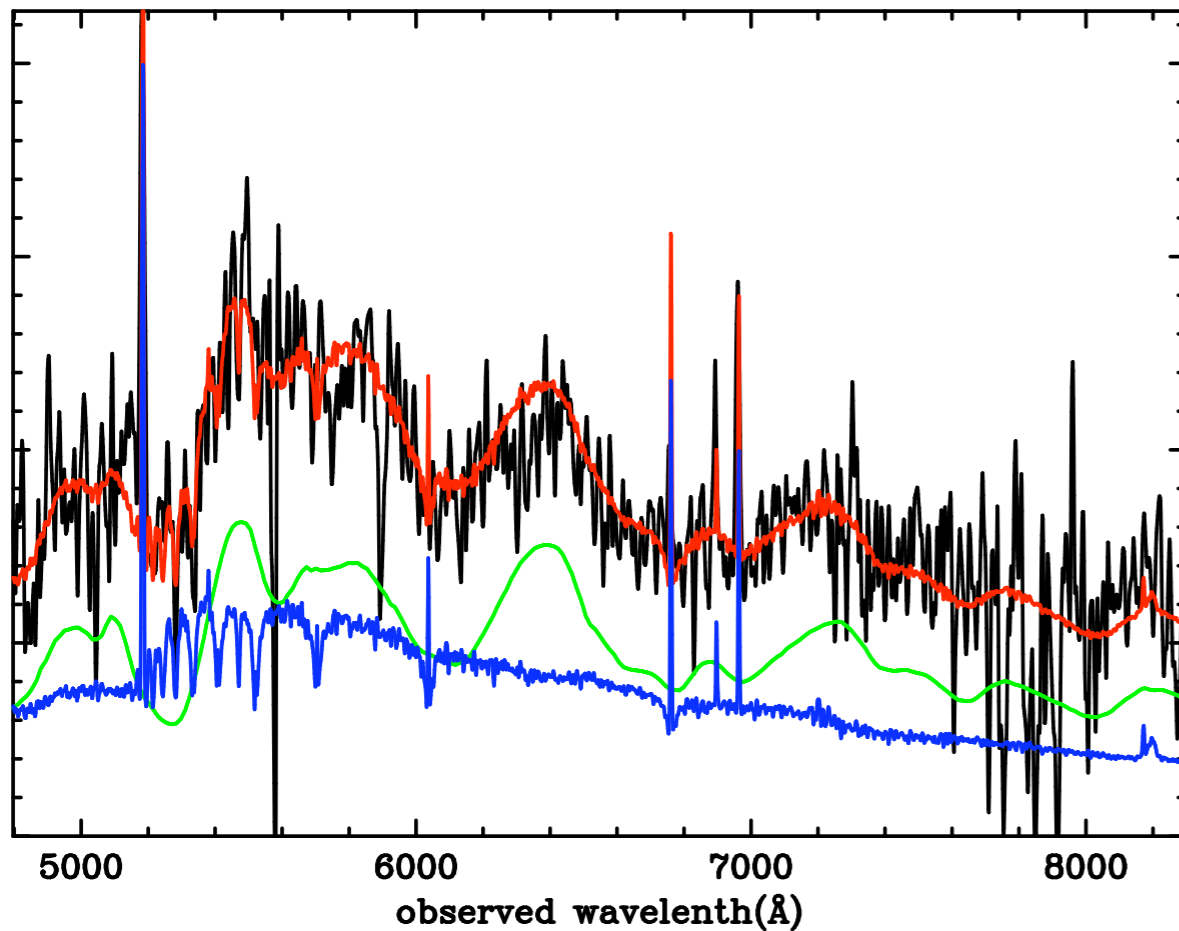
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**322 SN Ia + 44 CC SNe in 6 months.**

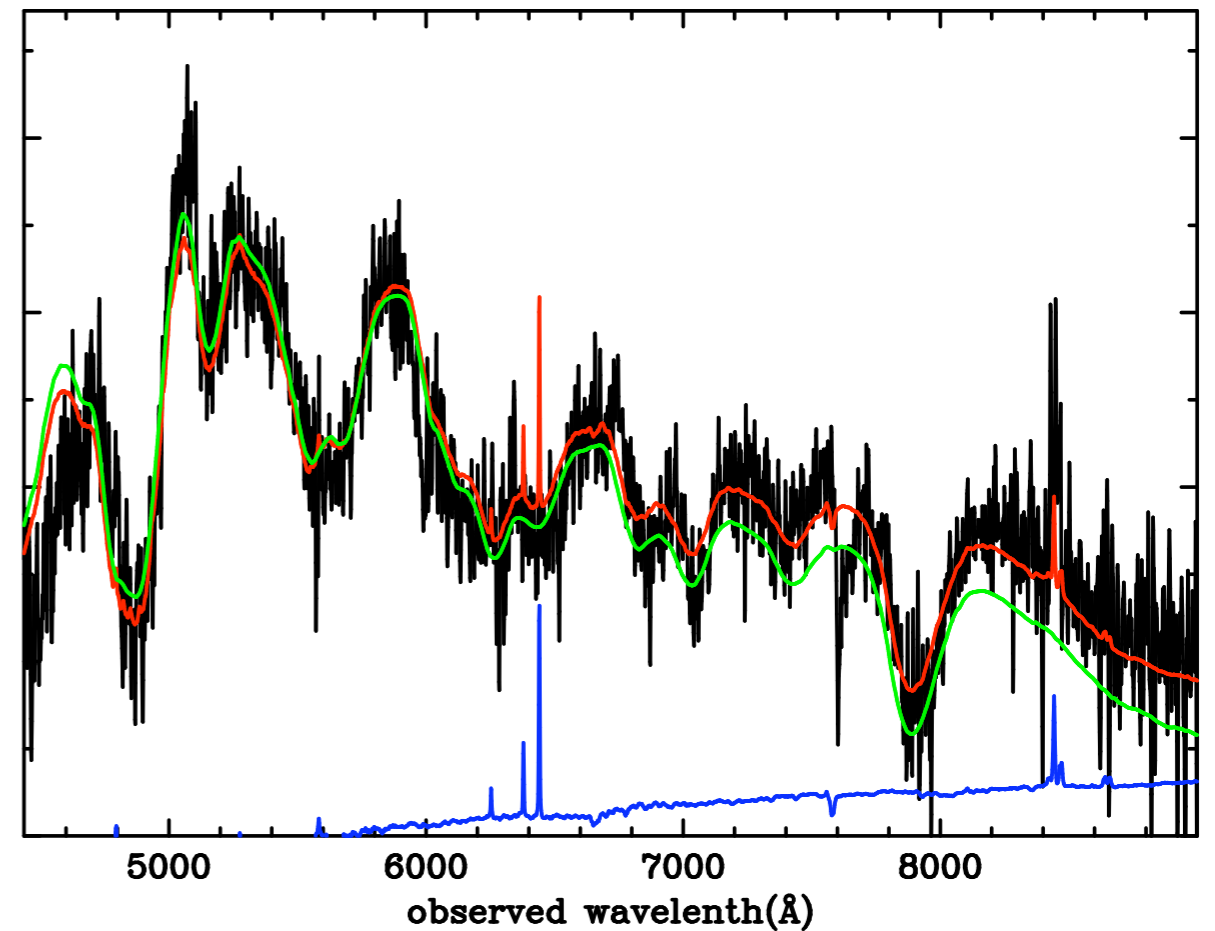


# Spectroscopy

2005kq SNIa  $z=0.3904$  SN Phase=+9d



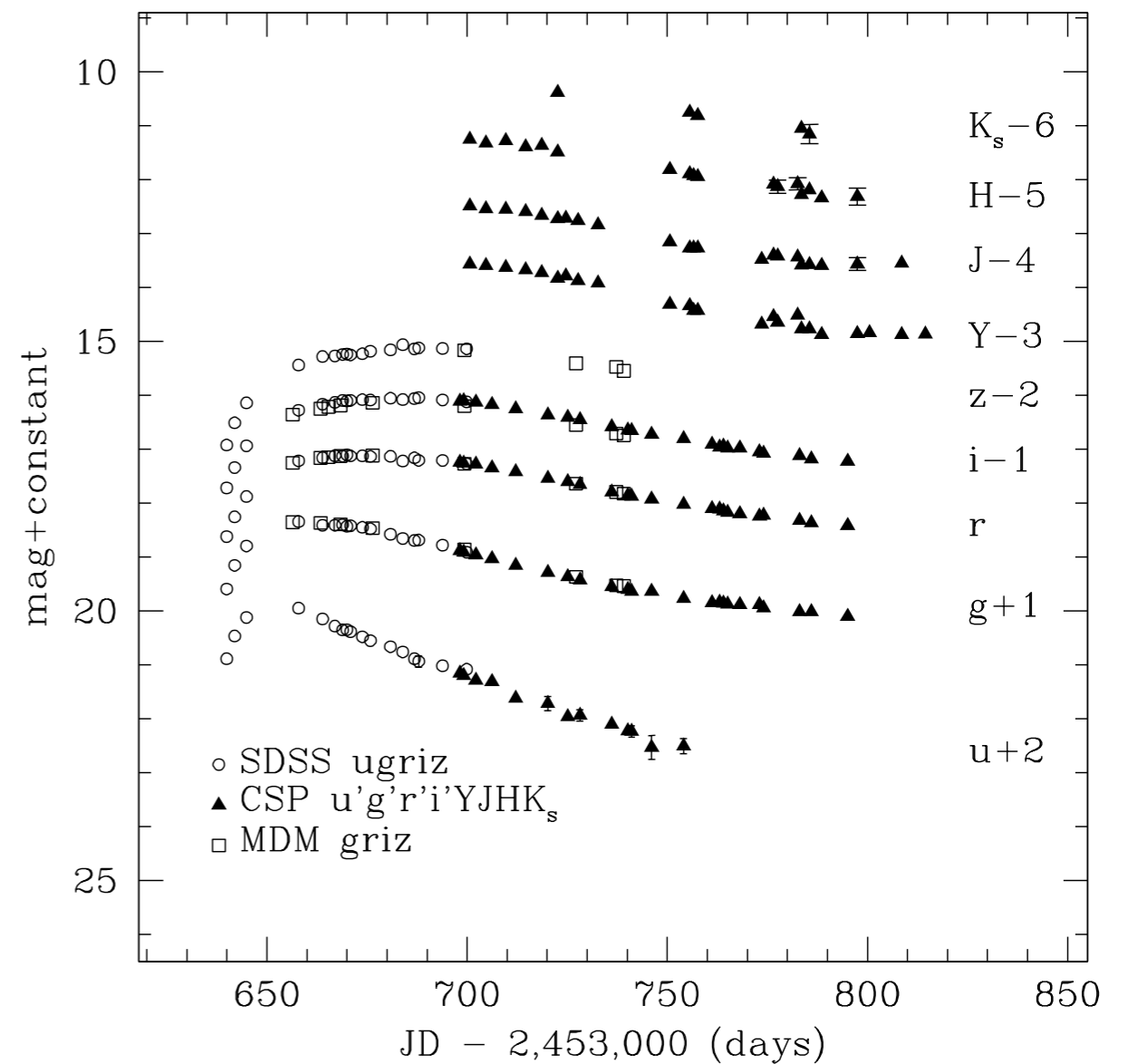
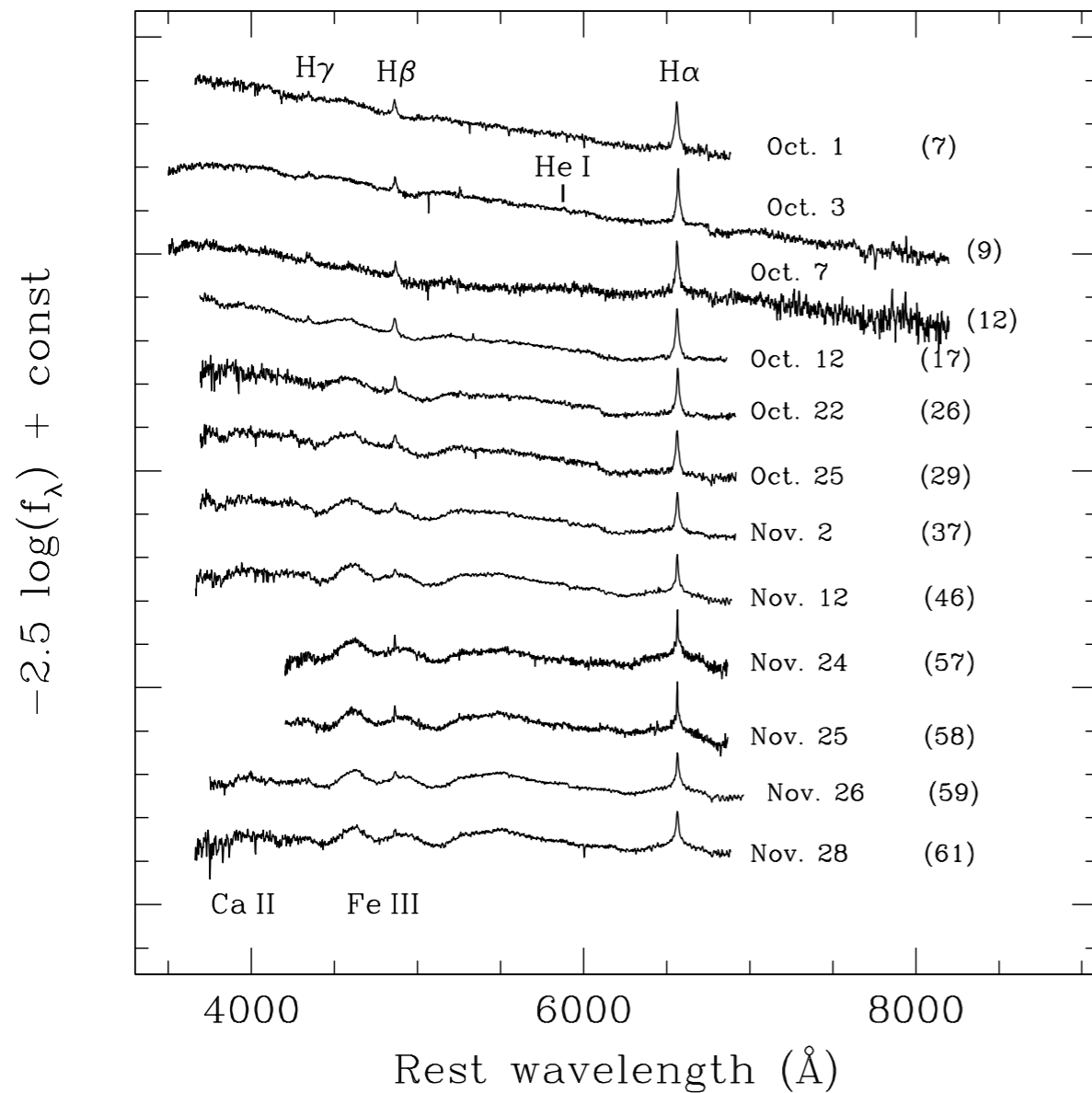
2005fr SNIa  $z=0.286$  SN Phase=+7d



Zheng et al. (2007)

- total of 248 + 449 spectra taken in two seasons.
- multi-epoch spectroscopy of selected nearby SNe.

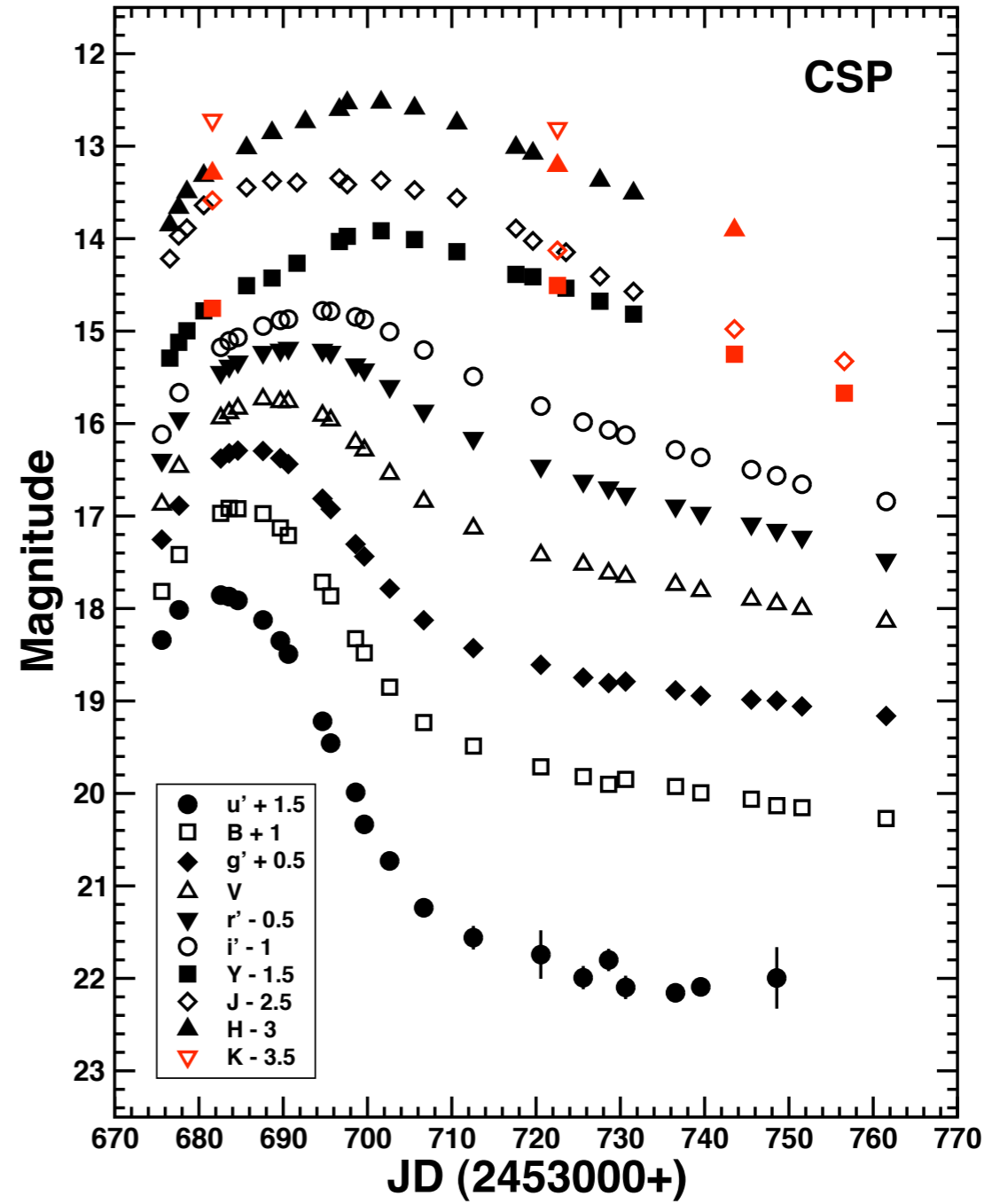
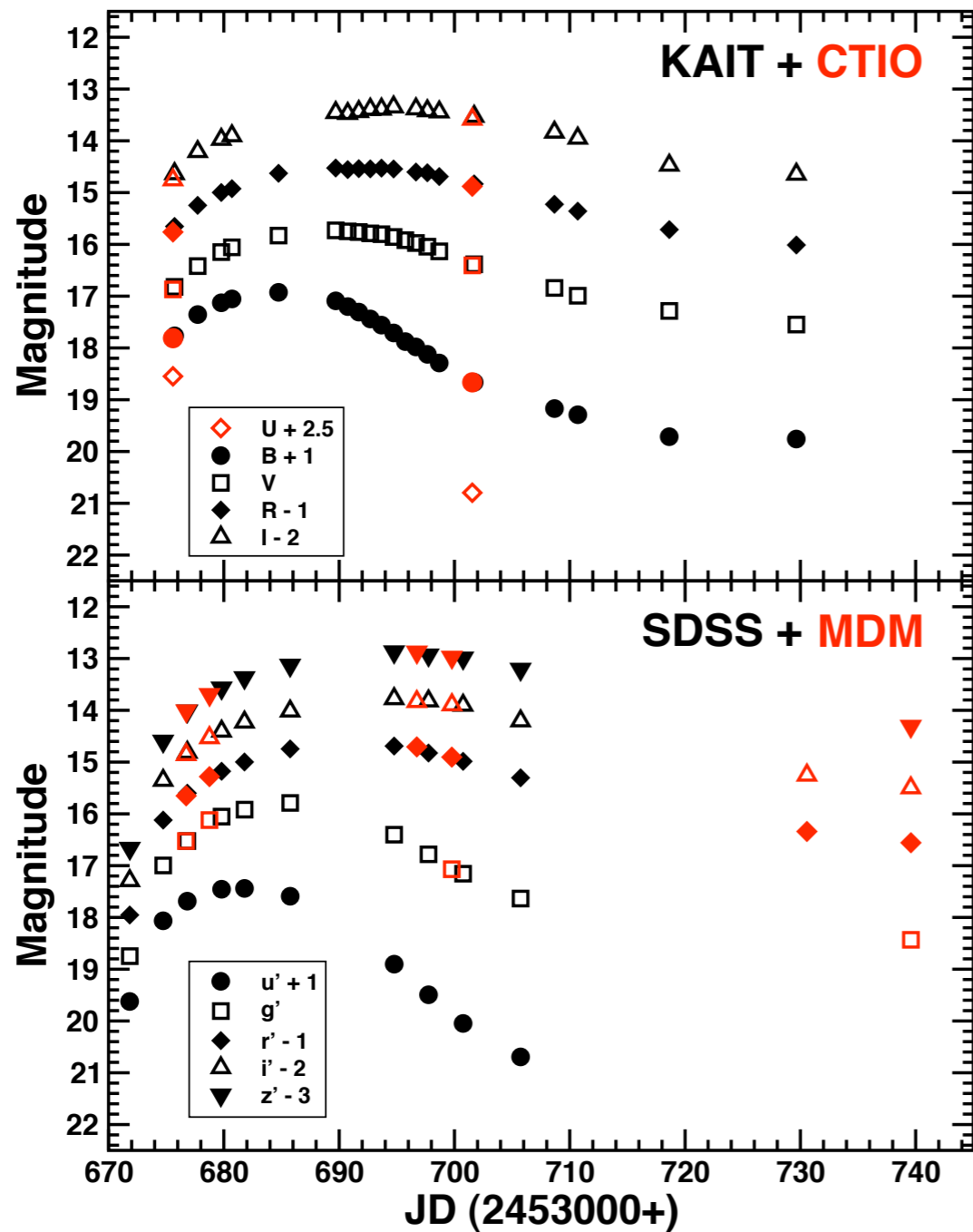




Prieto et al. (2007)

## SN2005gj

- co-discovered by SDSS-II & SNFactory
- SDSS + CSP + MDM data
- SN2002ic-like thermonuclear SN in dense environment?



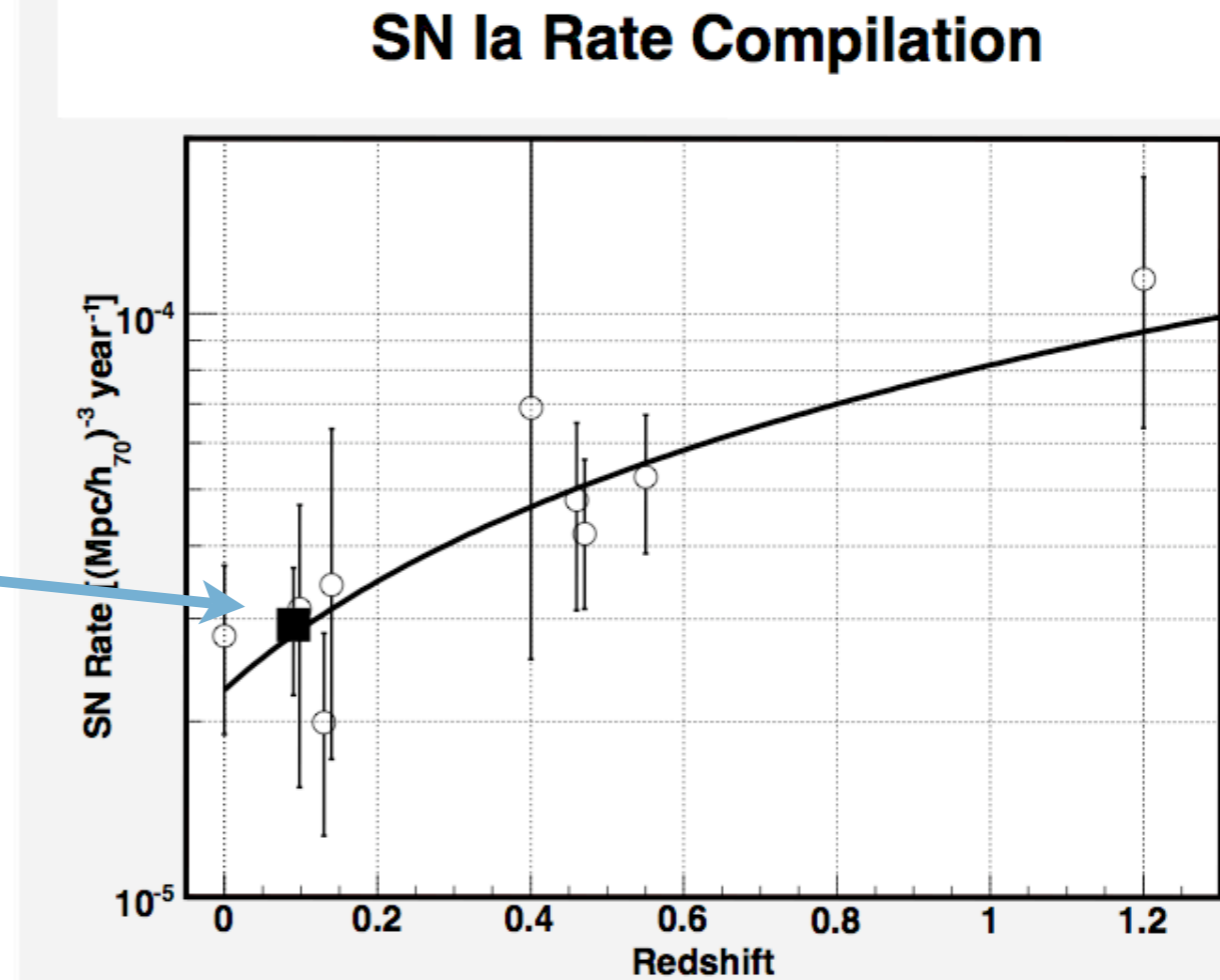
## SN2005hk

Phillips et al. (2007)

- underluminous SN Ia; low expansion velocity SN2002cx-like.
- pure deflagration?

# Low-z SN Ia Rate

**SDSS-II 2005 data  
(17 SN Ia  $z < 0.12$ )**

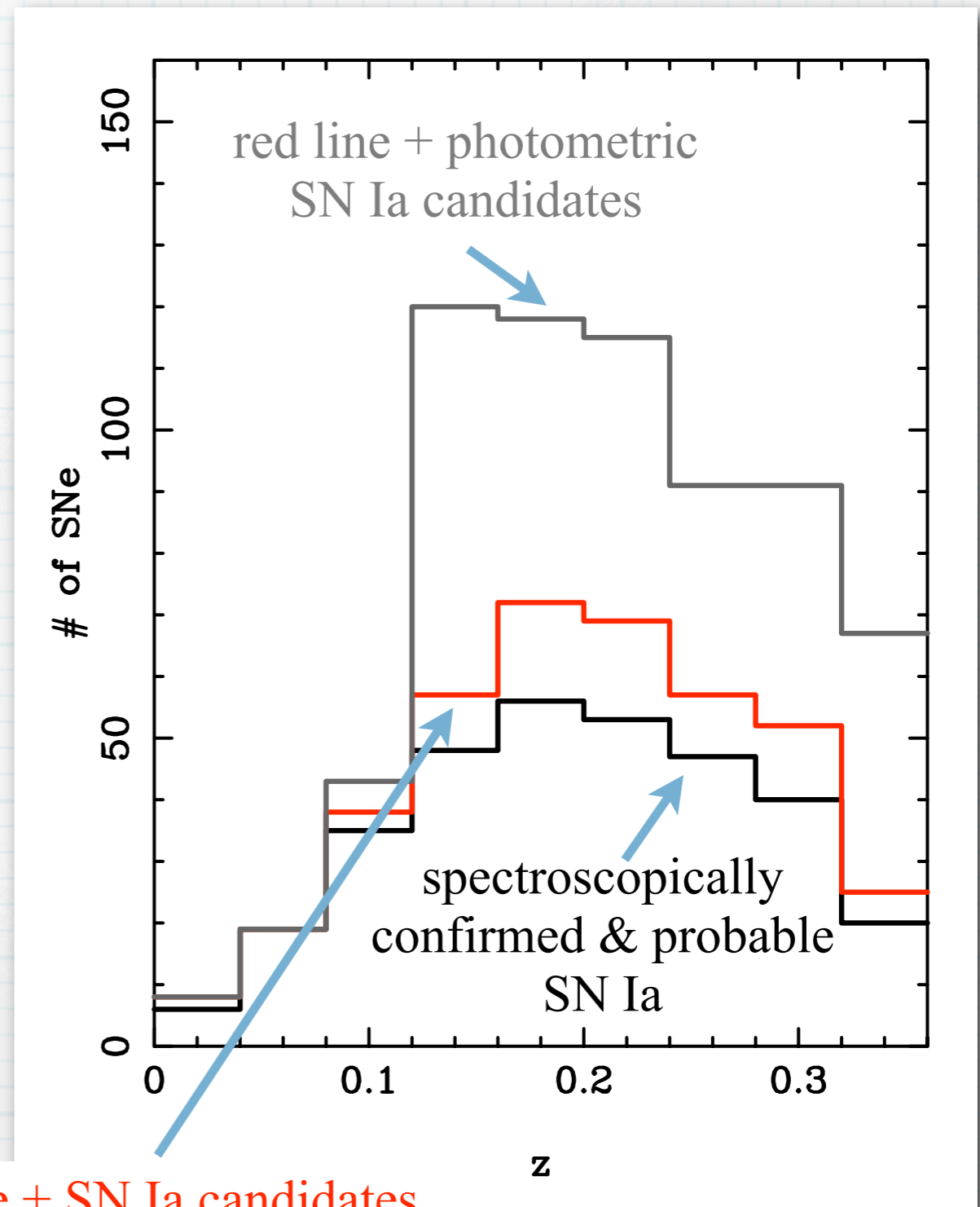


Dilday et al. (2007)

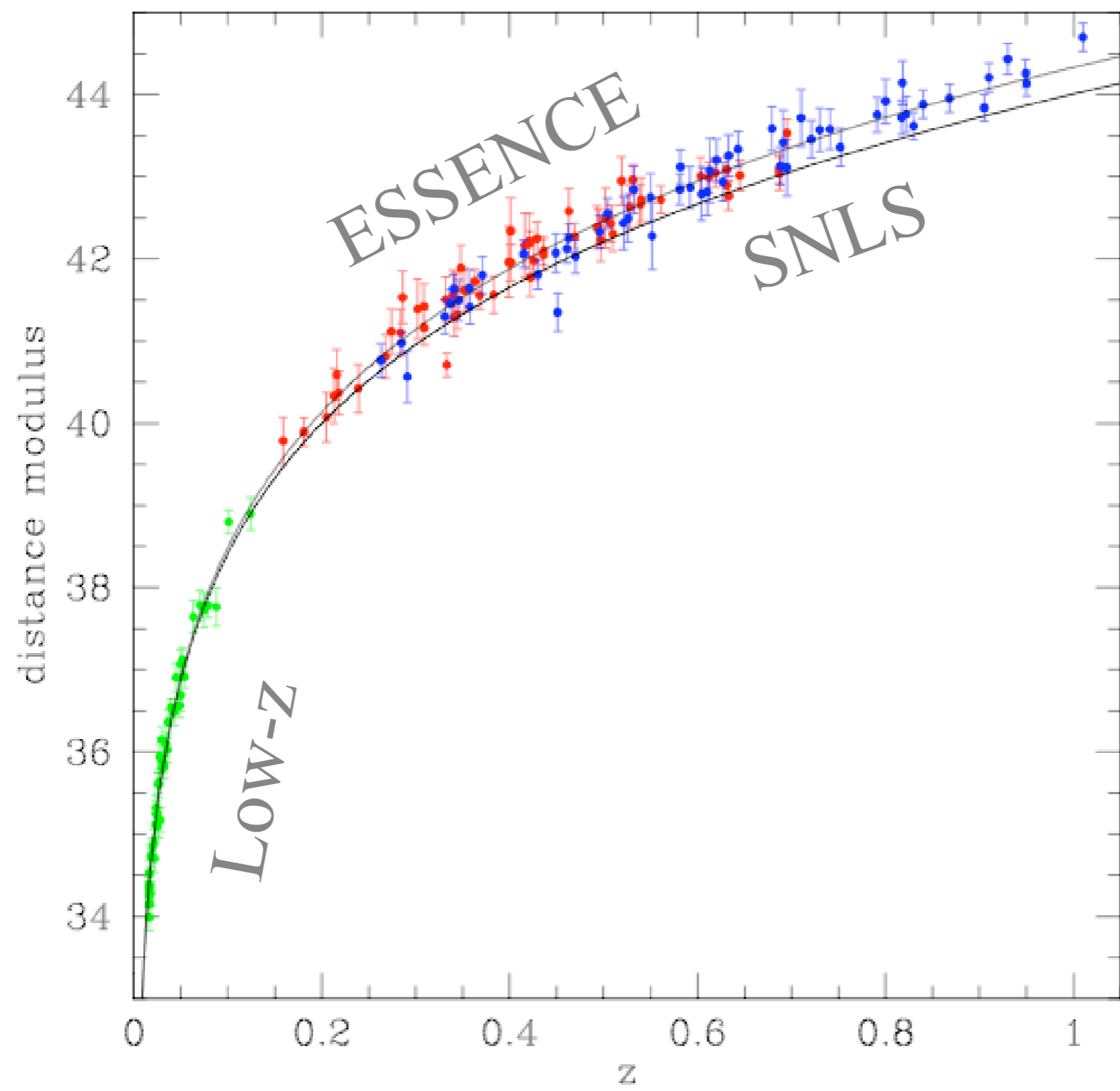
- blind search; well-understood efficiency.
- spectroscopic confirmation nearly complete out to  $z \sim 0.1$

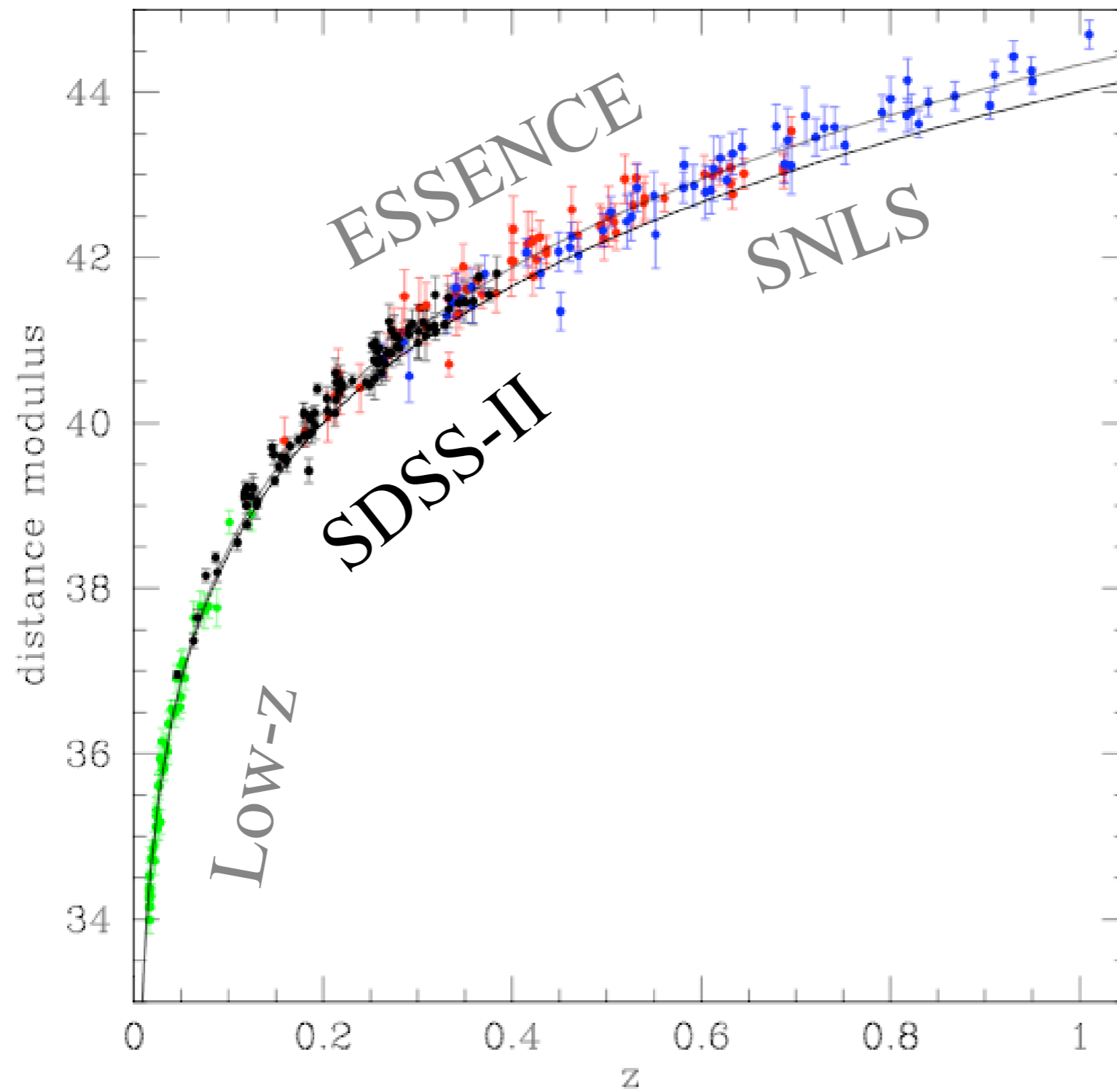
# Photometric SN Ia Candidates

- \* Identified an additional **239** high-quality photometric SN Ia candidates at  $z < 0.36$  (sample not complete).
- \* continue to obtain host redshifts.
- \* Determination of the rate at  $z \sim 0.3$ .



black line + SN Ia candidates  
with measured host galaxy redshifts





**2005 data**  
- 129 SN Ia  
- 89 after cuts

results this  
summer