Type II's, Ib/c's, and Other Non-Type Ia Supernovae From ROTSE-III

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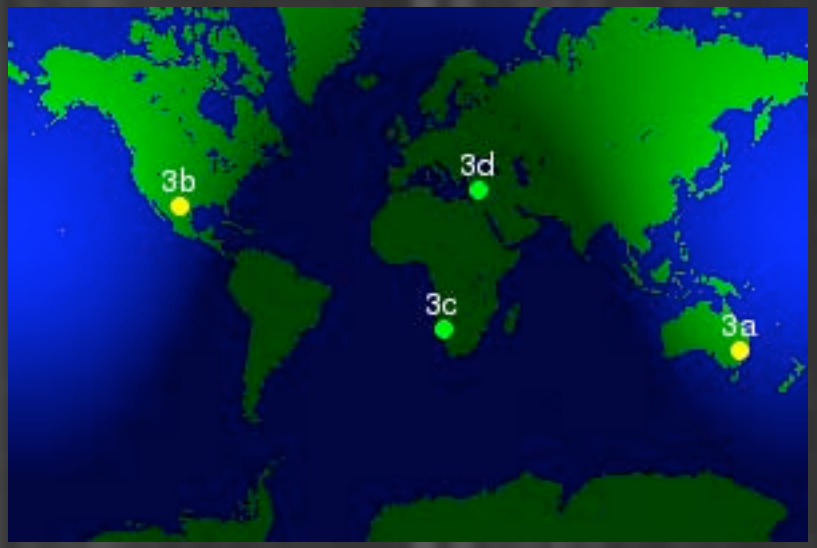
November 20, 2007

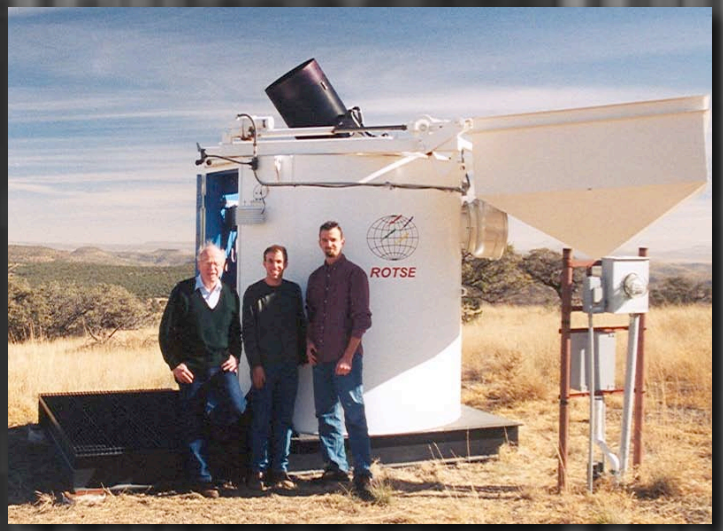
ROTSE-III

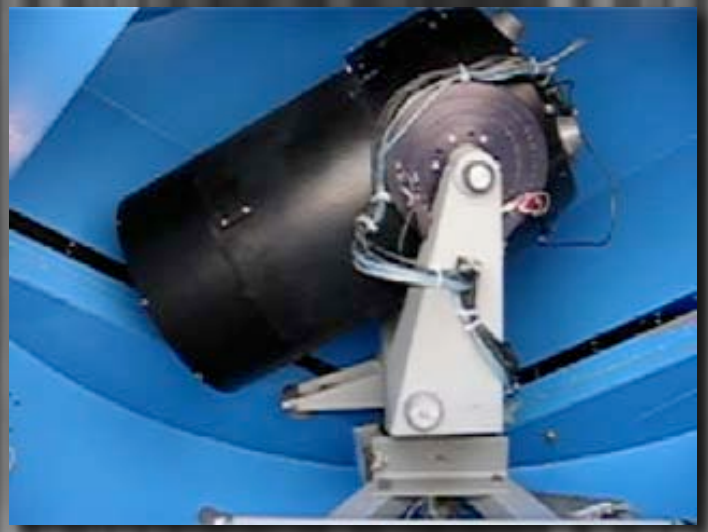


- Four 0.45 m telescopes positioned around the world
- Designed to capture the optical afterglows associated with gamma-ray bursts (Akerlof et al. 2003)
- Fully robotic operation

ROTSE-IIIb

- Designed for rapid response to GRB triggers
- 45 cm, f/1.9 primary
- Low inertial weight design
- 1.85 x 1.85 degree FOV
- 2k x 2k Marconi CCD (3.25 ”/pixel)
- Typical limiting magnitudes of 17, 17.5, and 18.5 in 5s, 20s, and 60s exposures
- Texas share 30% each night

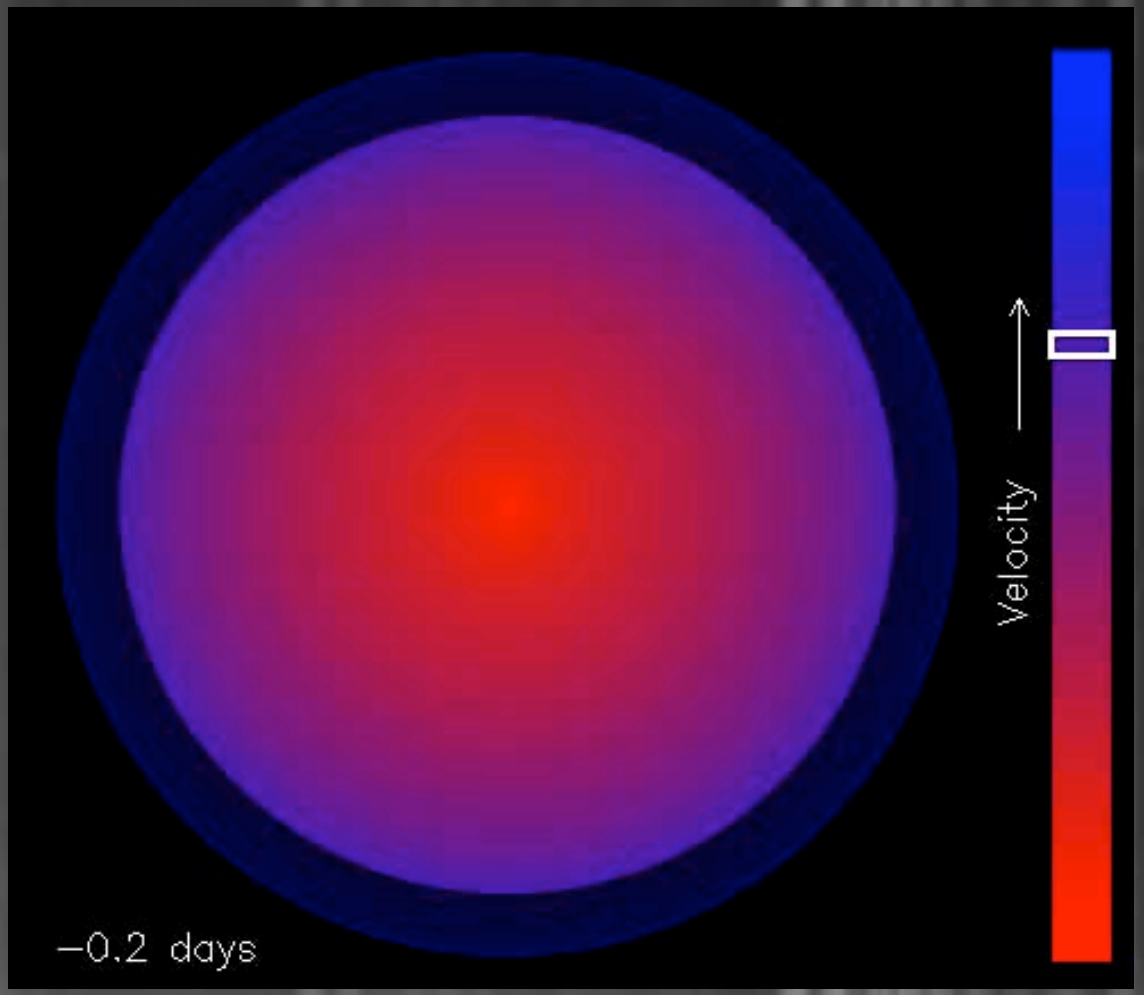




Hobby-Eberly Telescope

- Located at the McDonald observatory
- 11.1 x 9.8 m primary (9.2 m effective aperture)
- Fixed elevation
- Arecibo style tracker
- Queue scheduled
- Dedicated to spectroscopy

Photosphere



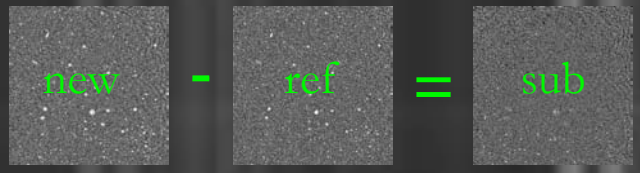
Texas Supernova Search

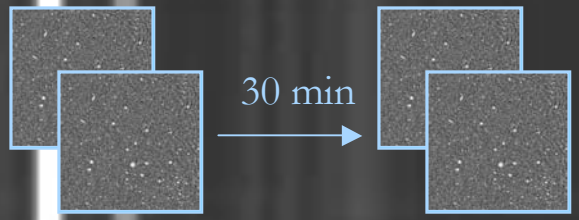
Project goal: to discover and spectroscopically follow-up the youngest possible SNe.

- Blind, wide field search with ROTSE-IIIb
- Visit each field every 1-3 days
- Rapid spectroscopic follow-up with the HET

Pipeline

Subtractions





shinsei

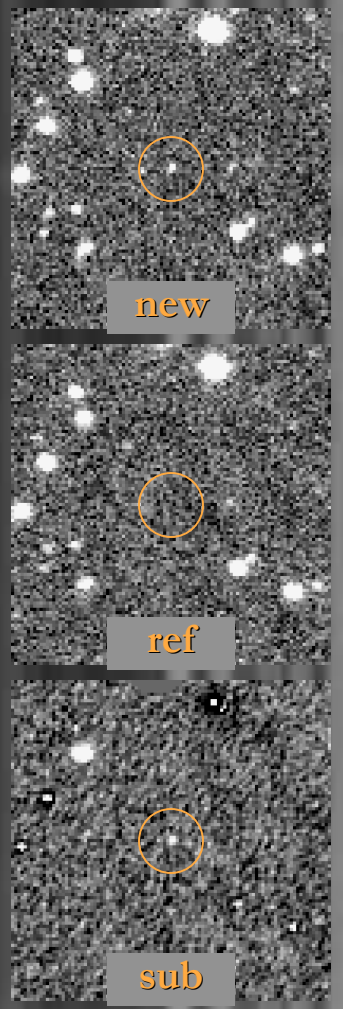
rotse3b

Imaging

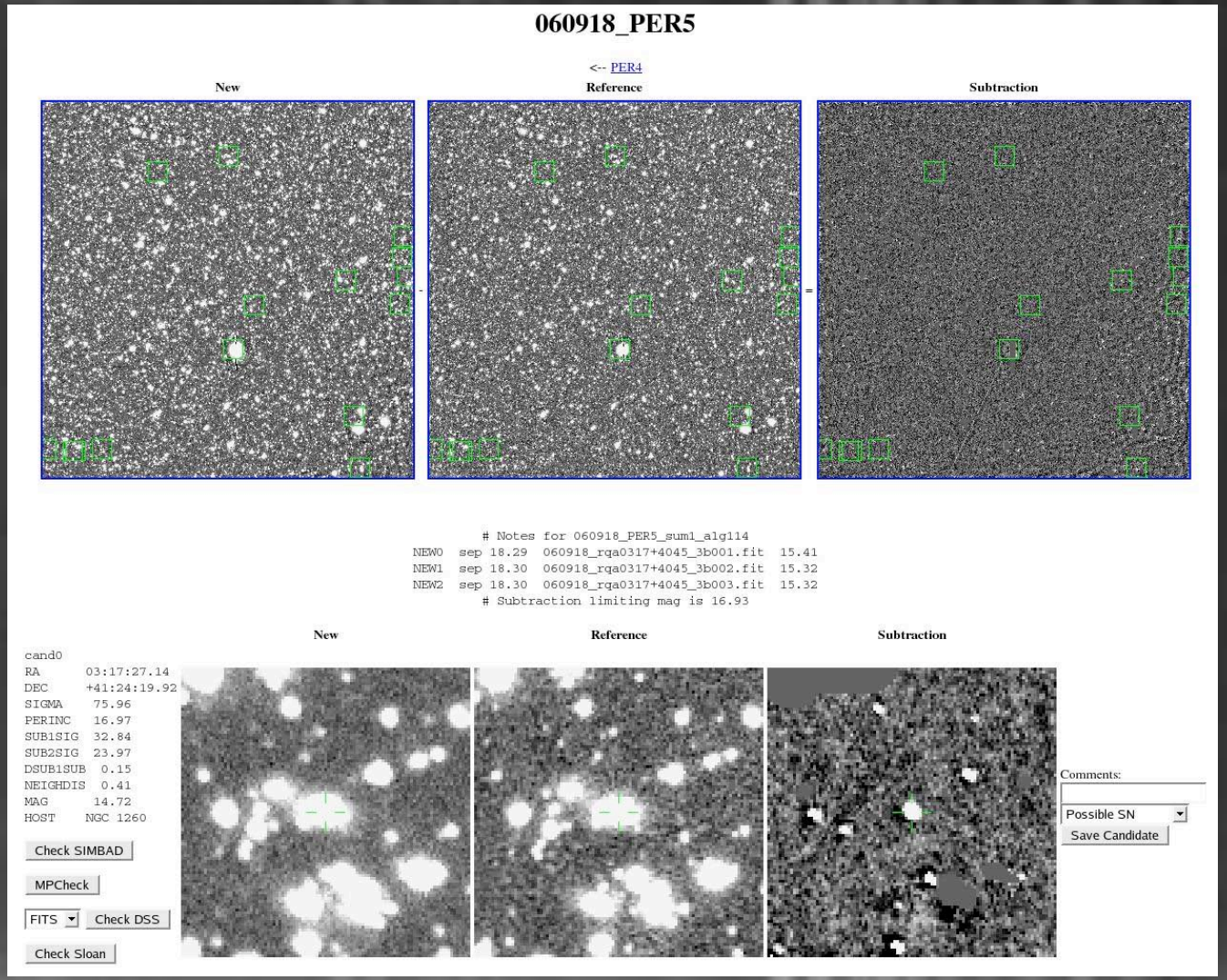
HET Spectrum

grad40

Scanning

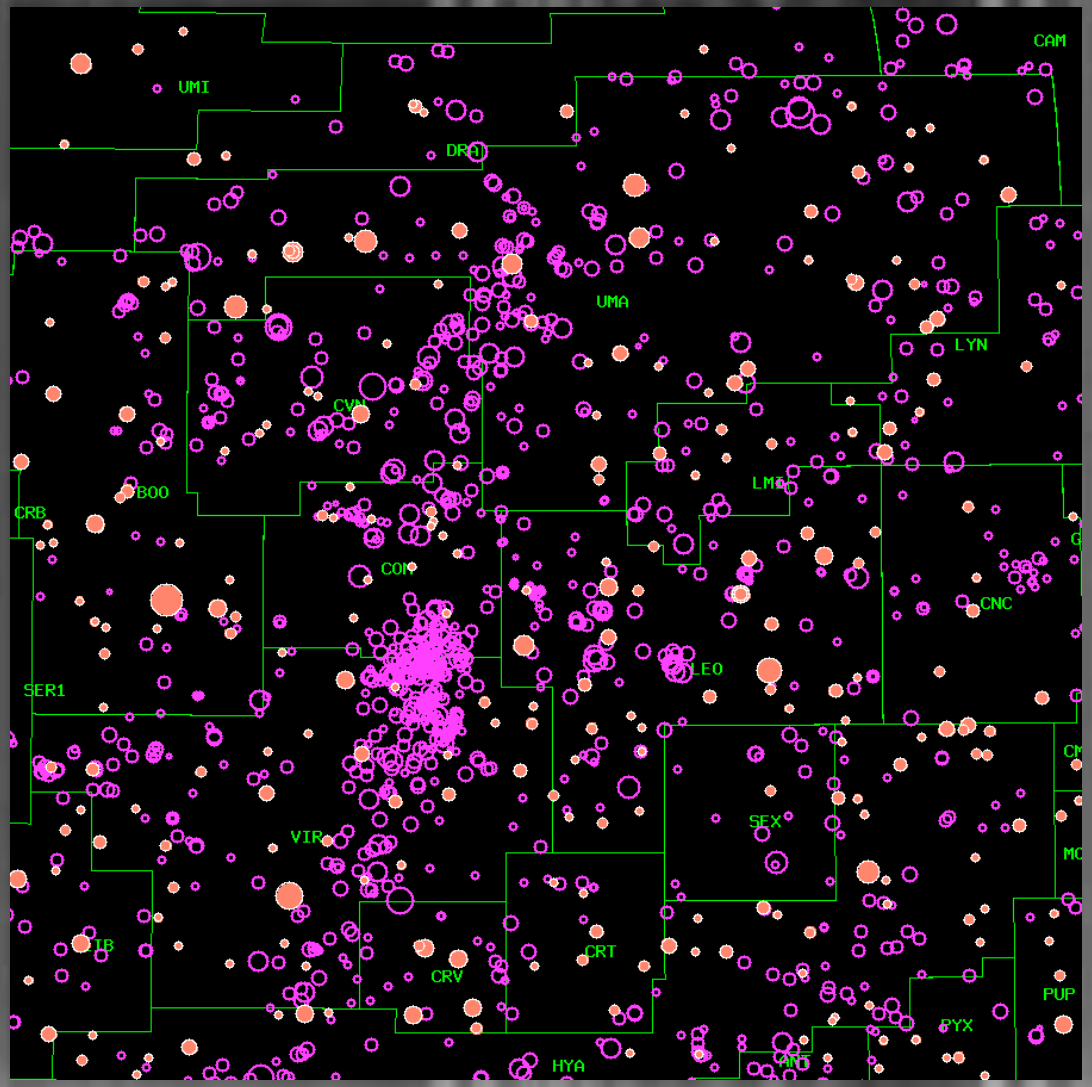


Scanning


060918_PER5
<-- PER4
New
Reference
Subtraction
Notes for 060918_PER5_sum1_alg114
NEW0 sep 18.29 060918_rqa0317+4045_3b001.fit 15.41
NEW1 sep 18.30 060918_rqa0317+4045_3b002.fit 15.32
NEW2 sep 18.30 060918_rqa0317+4045_3b003.fit 15.32
Subtraction limiting mag is 16.93
New
Reference
Subtraction
cand0
RA 03:17:27.14
DEC +41:24:19.92
SIGMA 75.96
PERINC 16.97
SUB1SIG 32.84
SUB2SIG 23.97
DSUB1SUB 0.15
NEIGHDIS 0.41
MAG 14.72
HOST NGC 1260
Check SIMBAD
MPCheck
FITS
Check DSS
Check Sloan
Comments:
Possible SN
Save Candidate

The Spring Sky

Target Galaxy Clusters to maximize galaxy sampling (takes advantage of ROTSE-IIIs wide field of view)

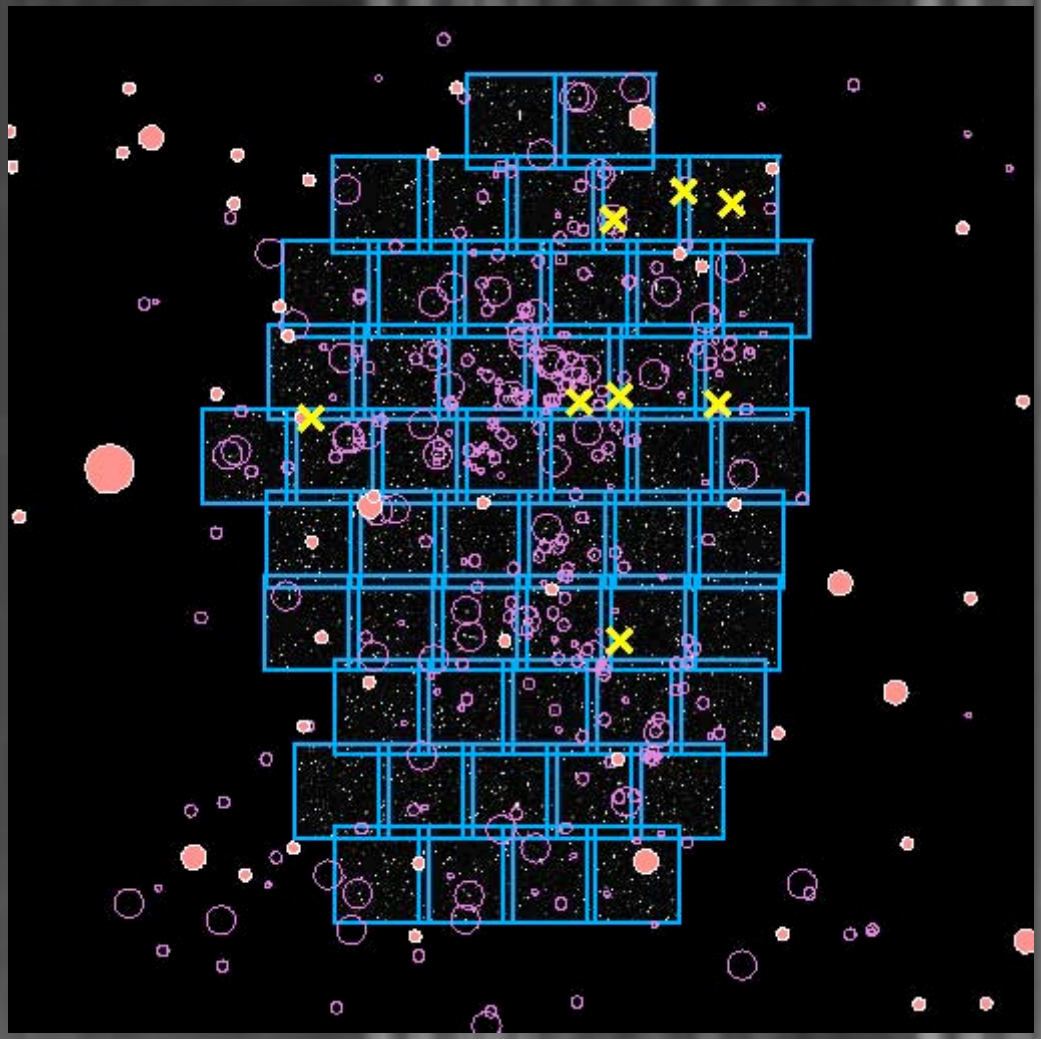


The Virgo Galaxy Cluster

Binggeli et al. 1985

Elliptical	30
S0	49
Spiral	128
Dwarf elliptical	828
Dwarf S0	30
Dwarf irregular	89
Dwarf irregular/elliptical	89
Other	34
Total	127

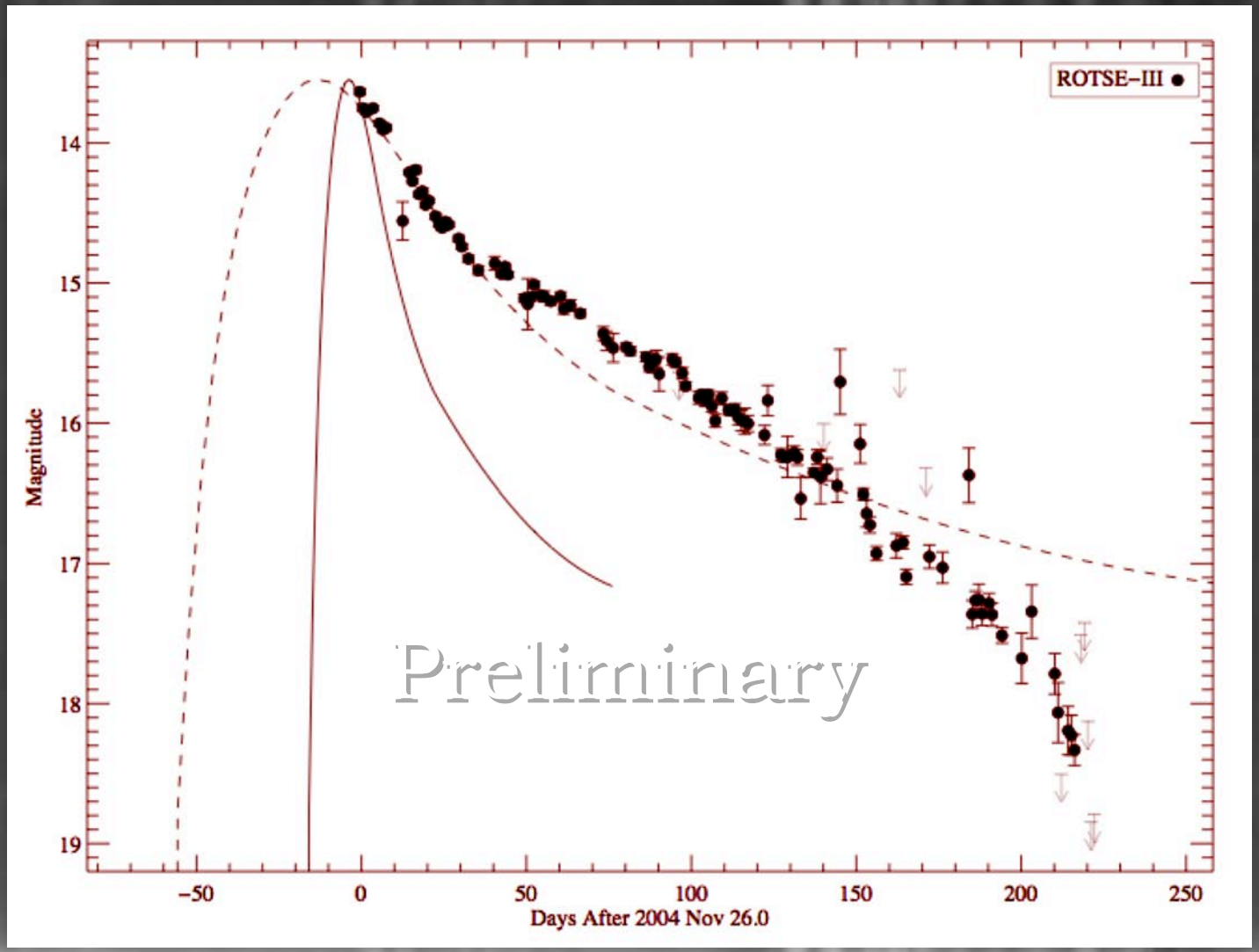
Distance ~20Mpc
SNIa at max light = 12 mag
Area ~140 deg^2



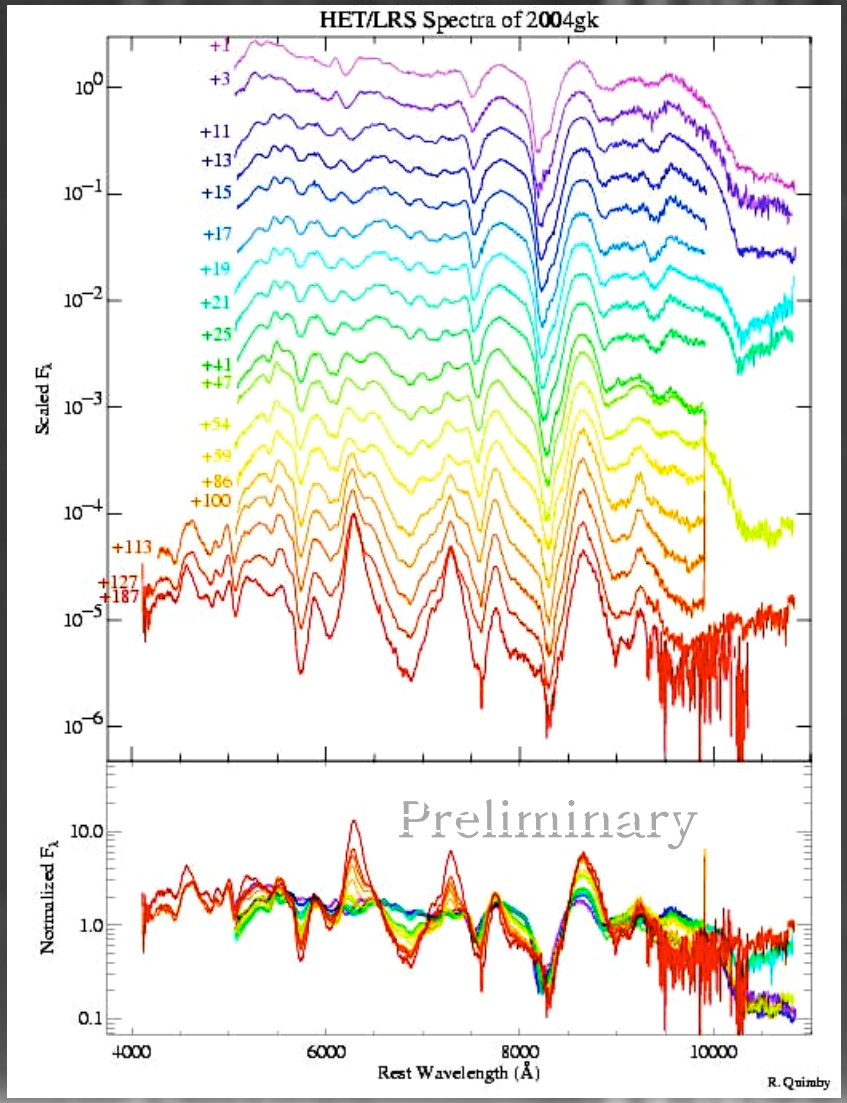
SN 2004gk Light Curve

First Discovery

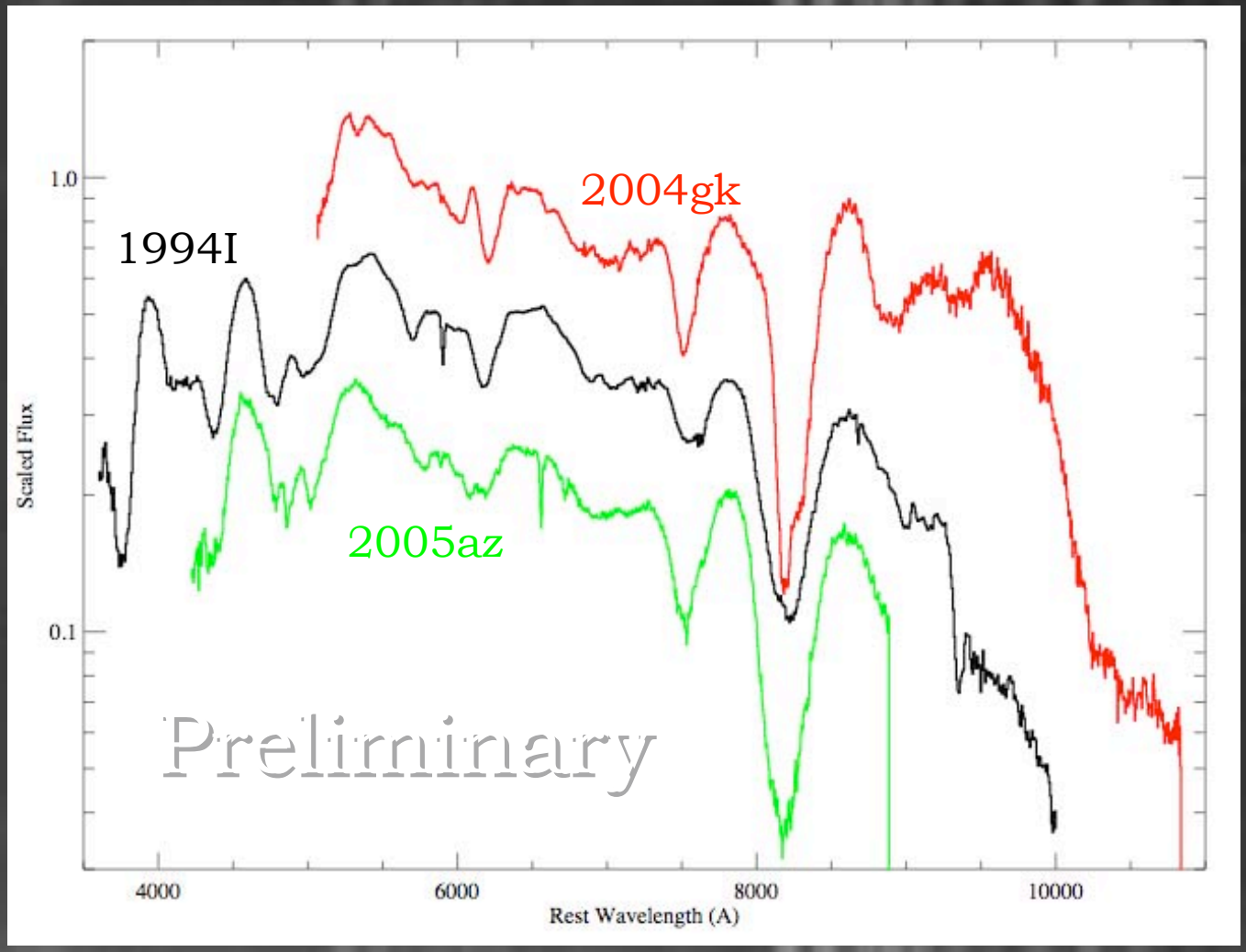
SN 2004gk Light Curve



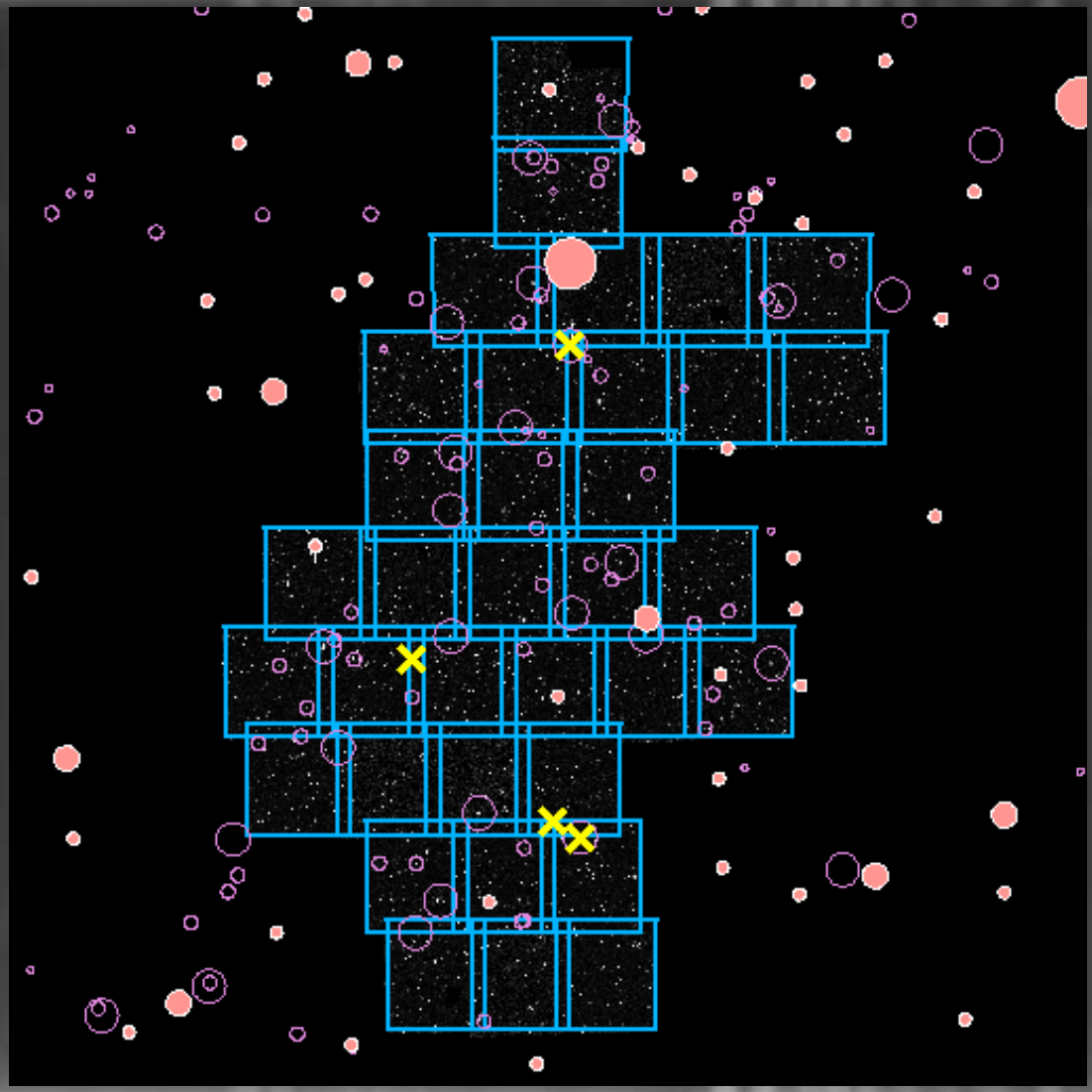
SN 2004gk Spectra



SNe Ic Spectra



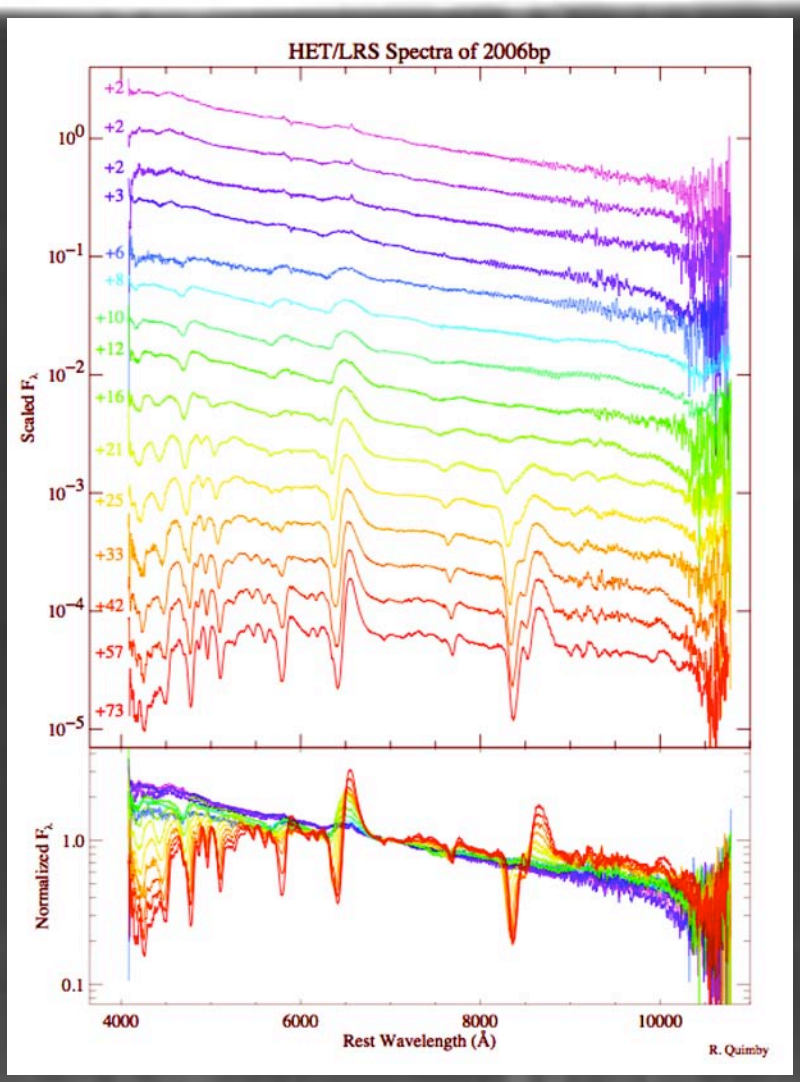
The Ursa Major Galaxy Cluster

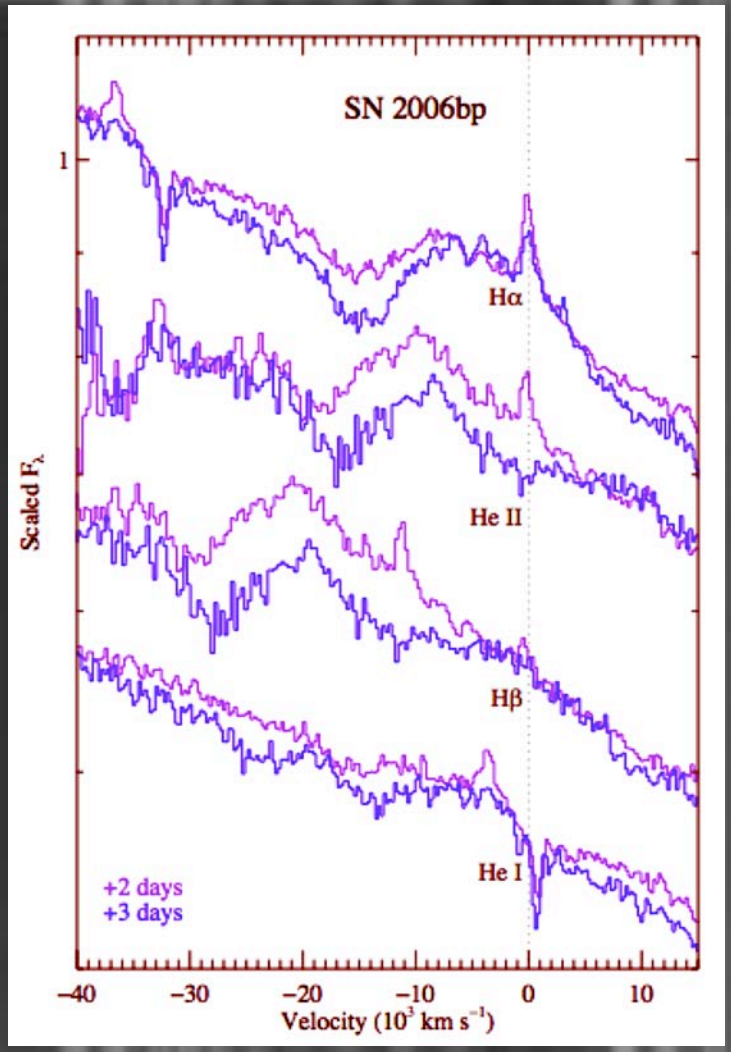


SN 2006bp Light Curve

Quimby et al. ApJ accepted (arXiv:0705.3478)

SN 2006bp Spectra

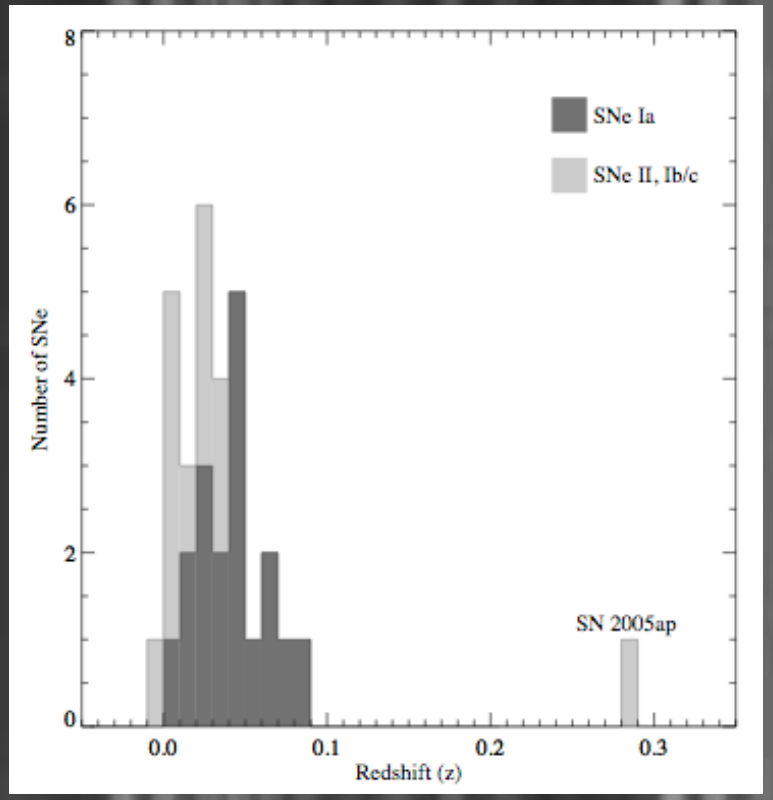




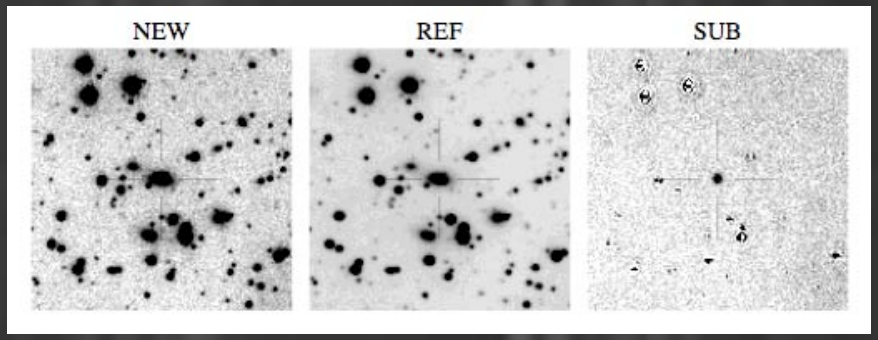
Quimby et al. ApJ accepted (arXiv:0705.3478)

TSS Discoveries

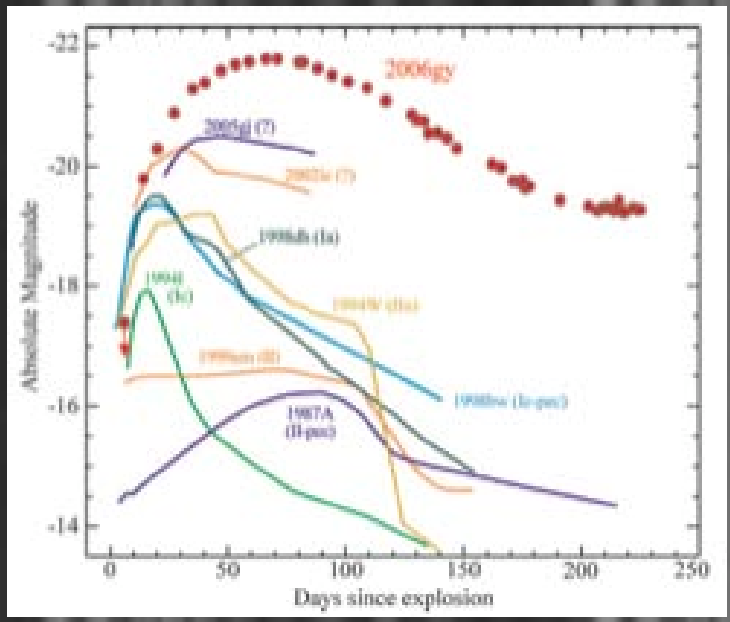
- 35 (29) Supernovae
  - 18 SNe Ia
  - 10 SNe II
  - 7 SNe Ib/c or peculiar
  - median redshift z~0.03
  - ~8 SNe in M > -17 hosts
- 12 Novae
  - 11 in M31, 1 in M33
- 6 Dwarf Novae



SN 2006gy



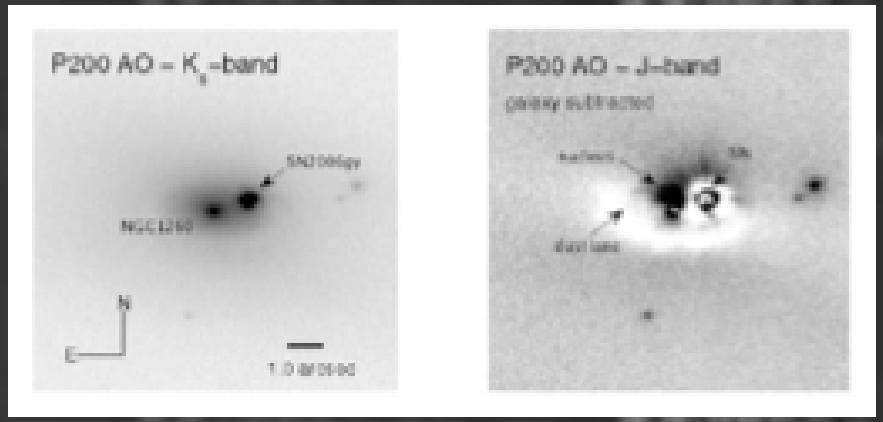
z=0.01919



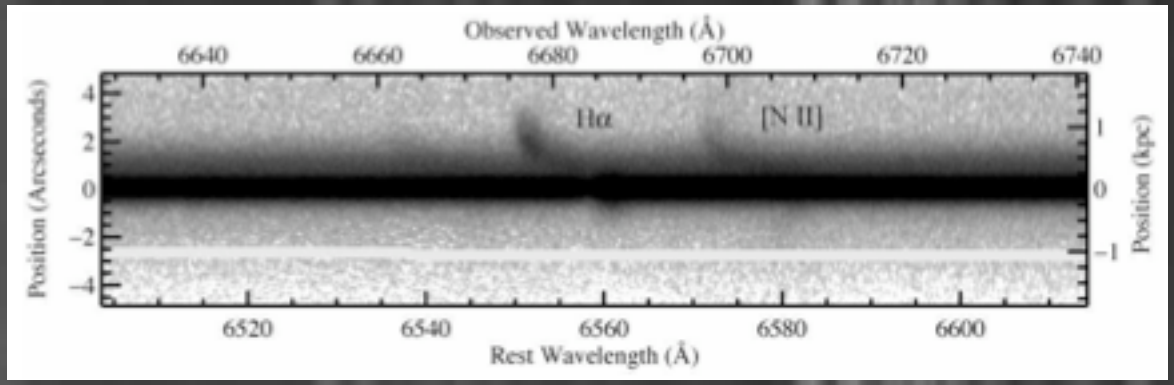
N. Smith et al. 2007

- Found near core of NGC 1260
- Corrected M_{peak} ~ -22 mag

Young Stellar Population?

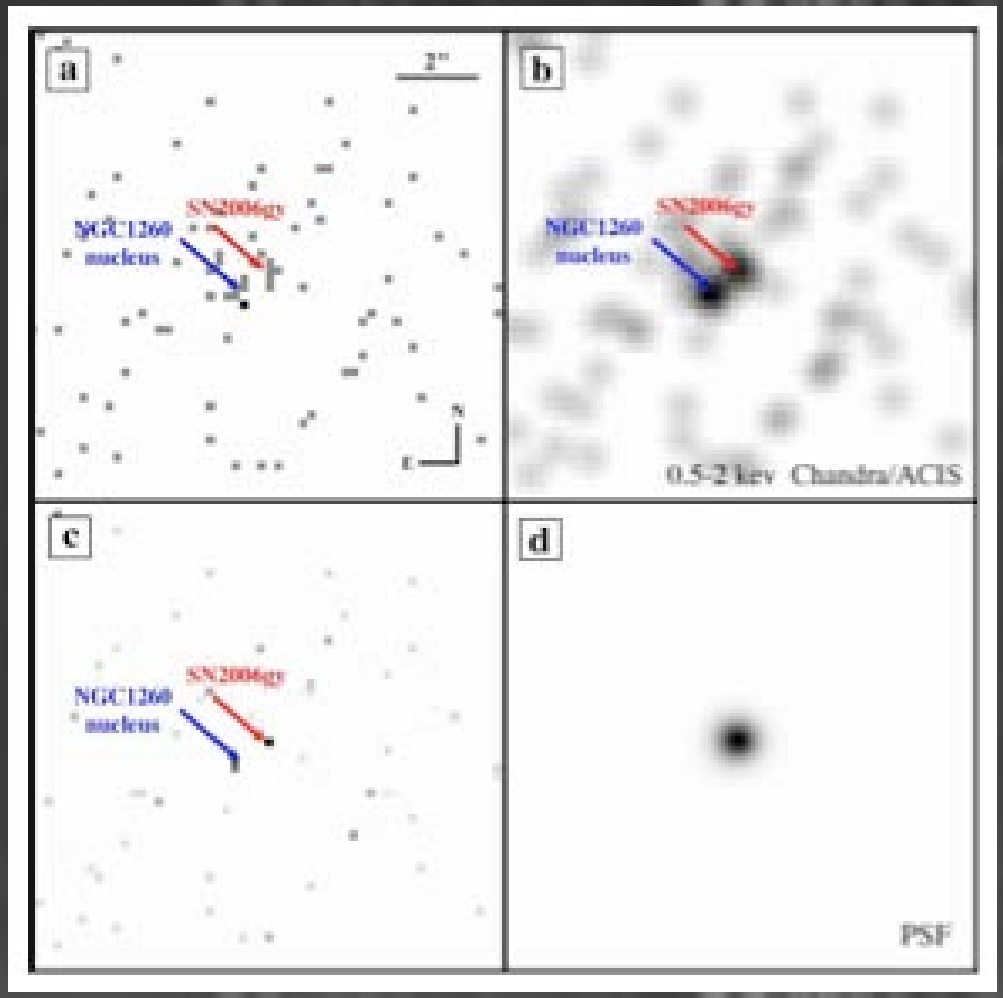


Ofek et al. 2007



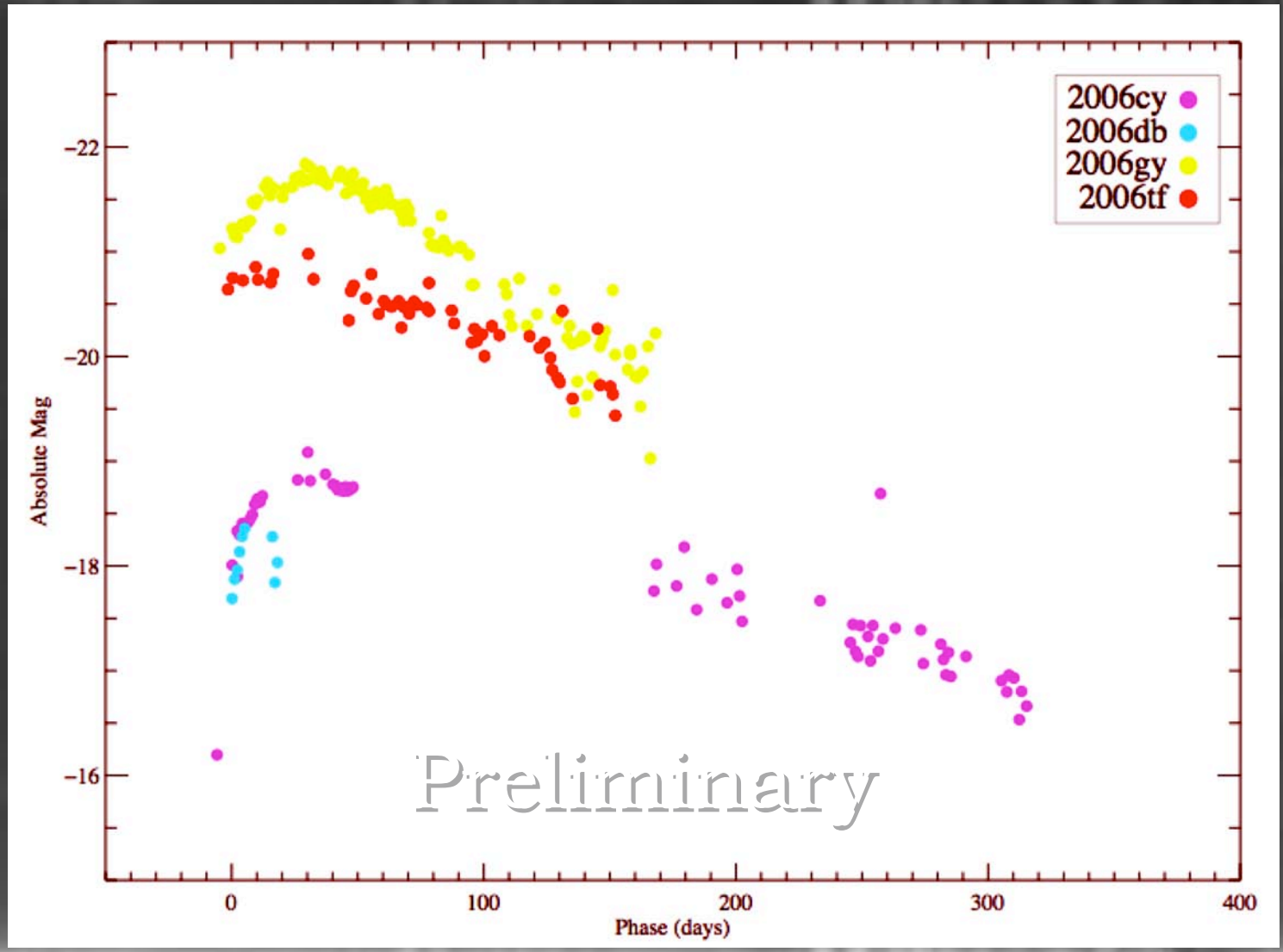
N. Smith et al. 2007

2006gy X-ray

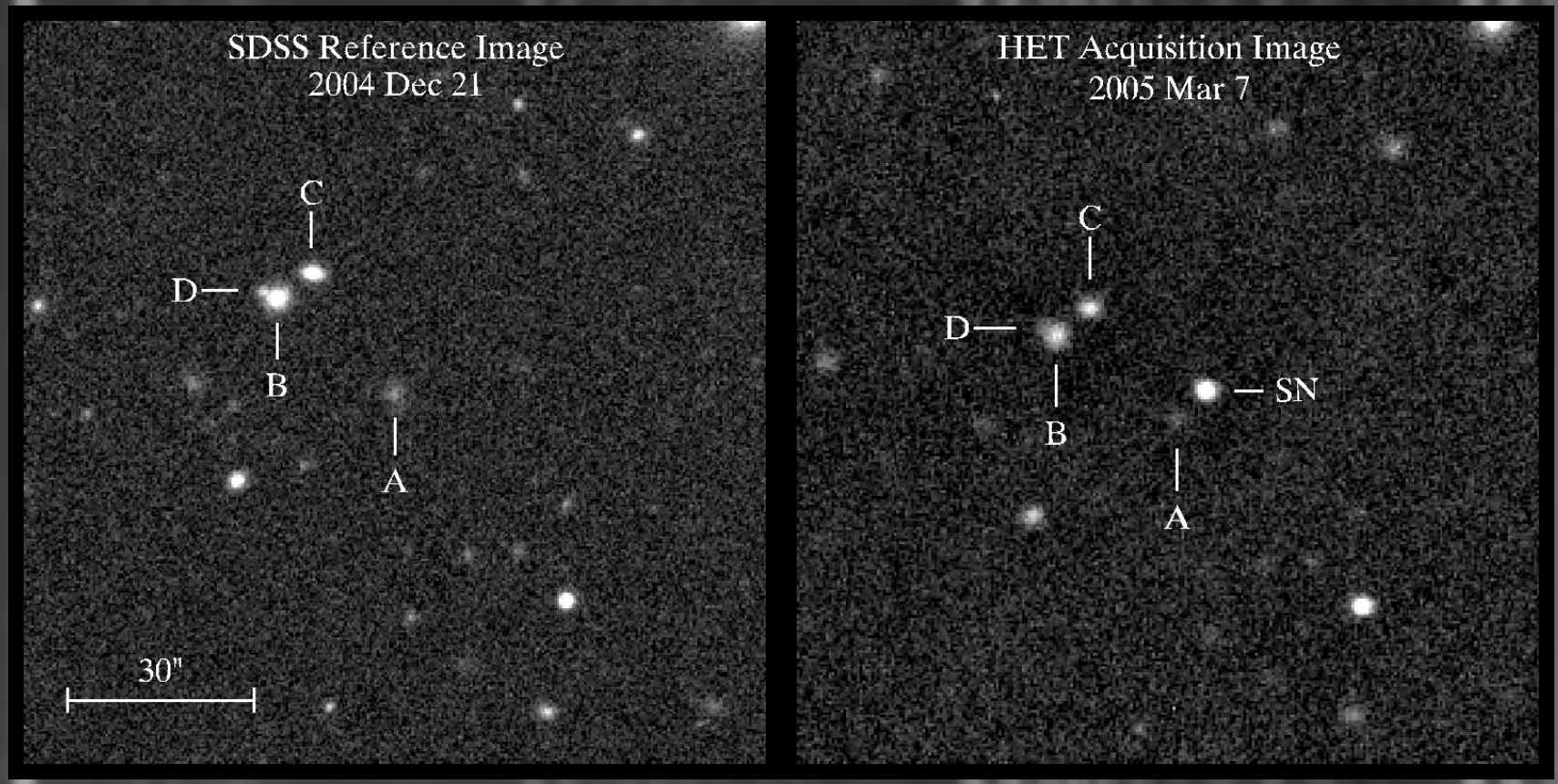


N. Smith et al. 2007

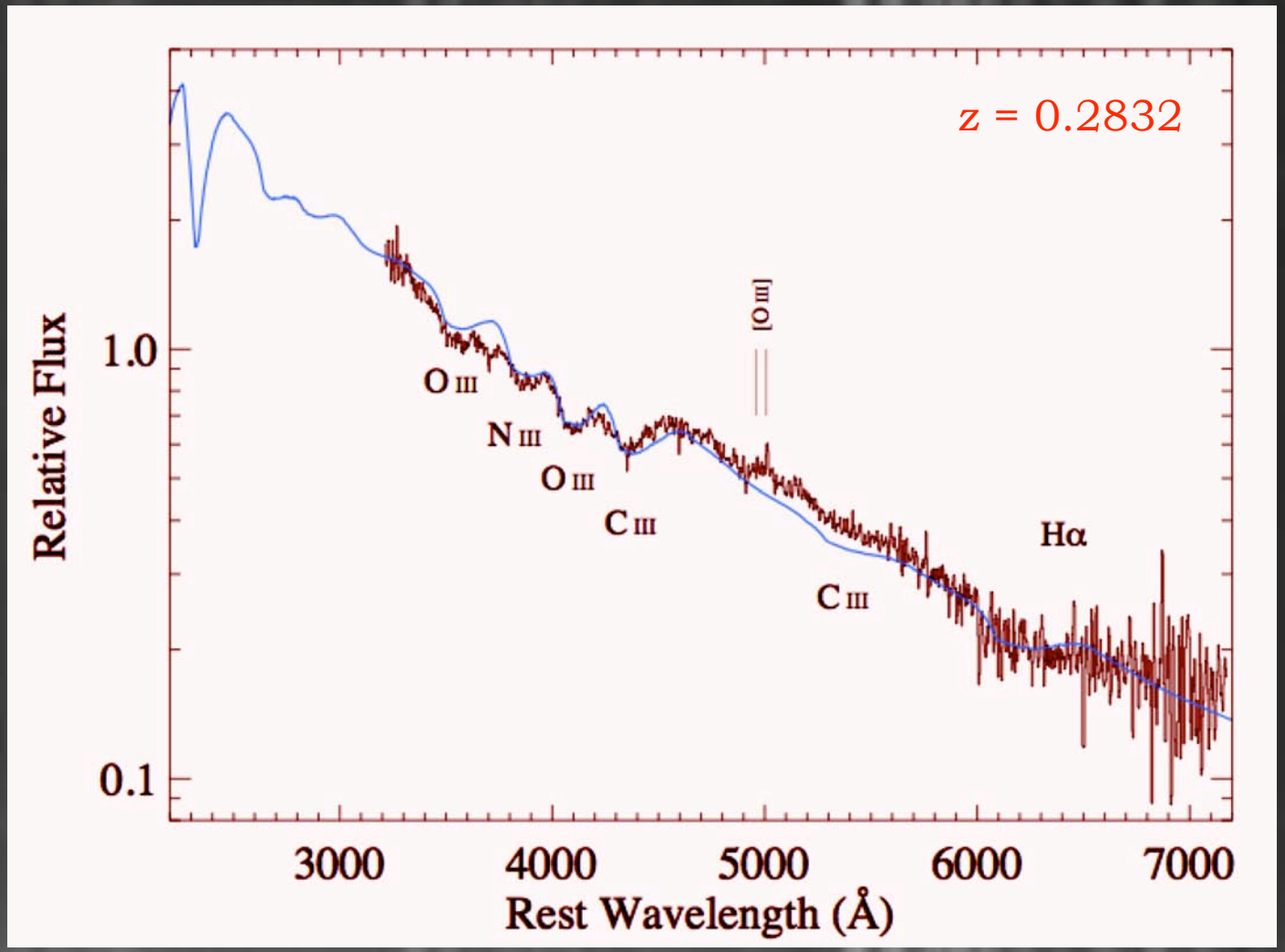
ROTSE SNe IIn



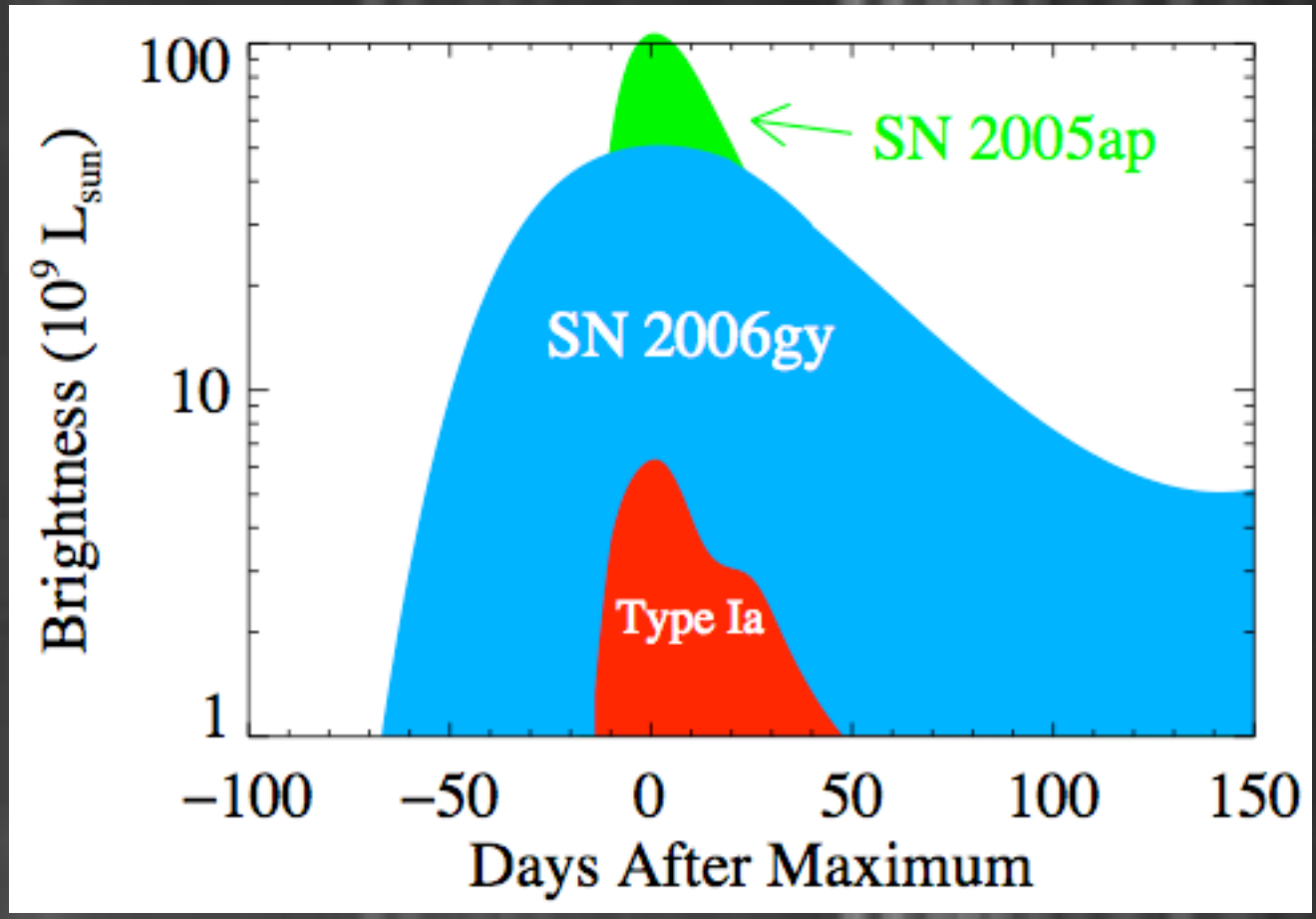
SN 2005ap


SDSS Reference Image
2004 Dec 21
C
D
B
A
30"
HET Acquisition Image
2005 Mar 7
C
D
B
SN
A

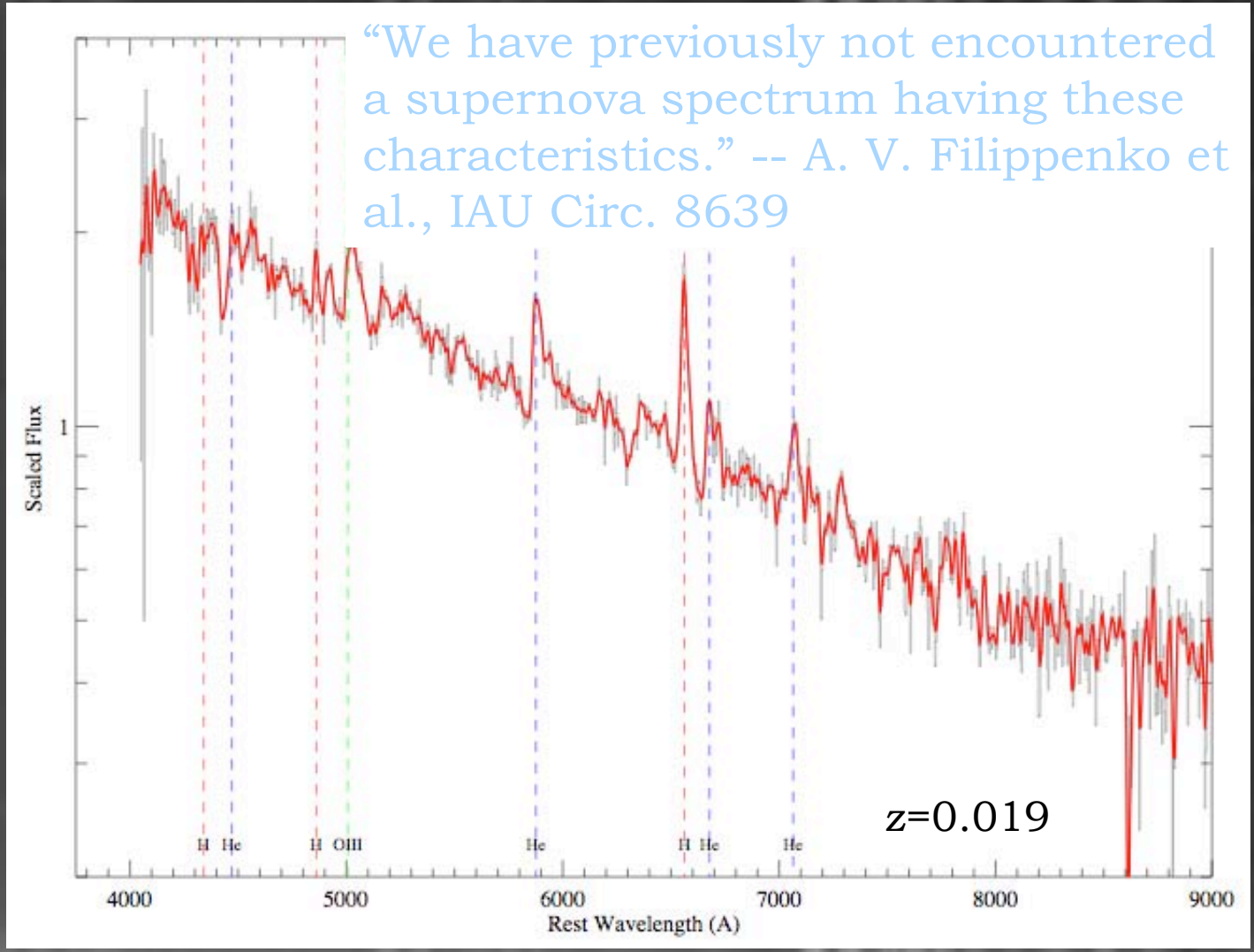
SN 2005ap HET Spectra



SN 2005ap Light Curve



SN 2005la (Type II/Ib-pec)



Pastorello et al. in prep


Thank You!