

CSP I

CSP I

- CSP = Carnegie SN project
- Follow-up of ~100 SN Ia, ~100 II, and some Ibc
- Based in LCO instruments and telescopes.
- High quality Opt & NIR photometry.
- Low z
- 2004-2009

CSP I

Results:

Type Ia:

- DR1: 35 SN Ia (2010)
- DR2: 50 SN Ia (2011).

Type II

- V-band Analysis of 71 SN II by Anderson(2013)

Type Ibc

- Analysis of ~40 SN Ibc by Taddia (in prep)

CSP I

Results:

Type Ia:

- DR1: 35 SN Ia (2010)
- DR2: 50 SN Ia (2011).

- Mark's: 87 % SN Ia published

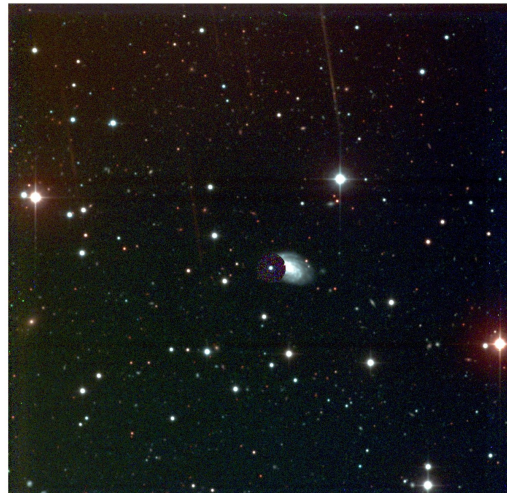
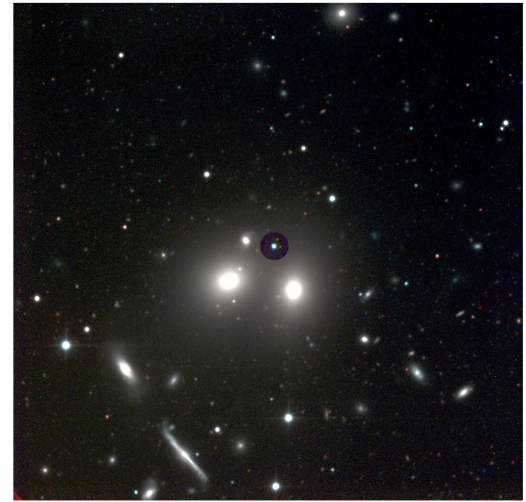
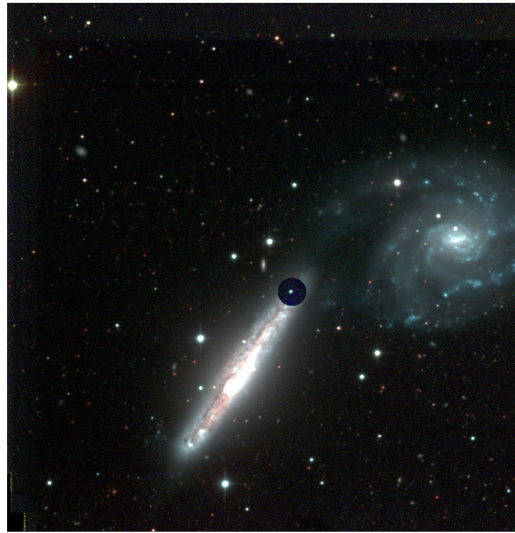
CSP I

Results:

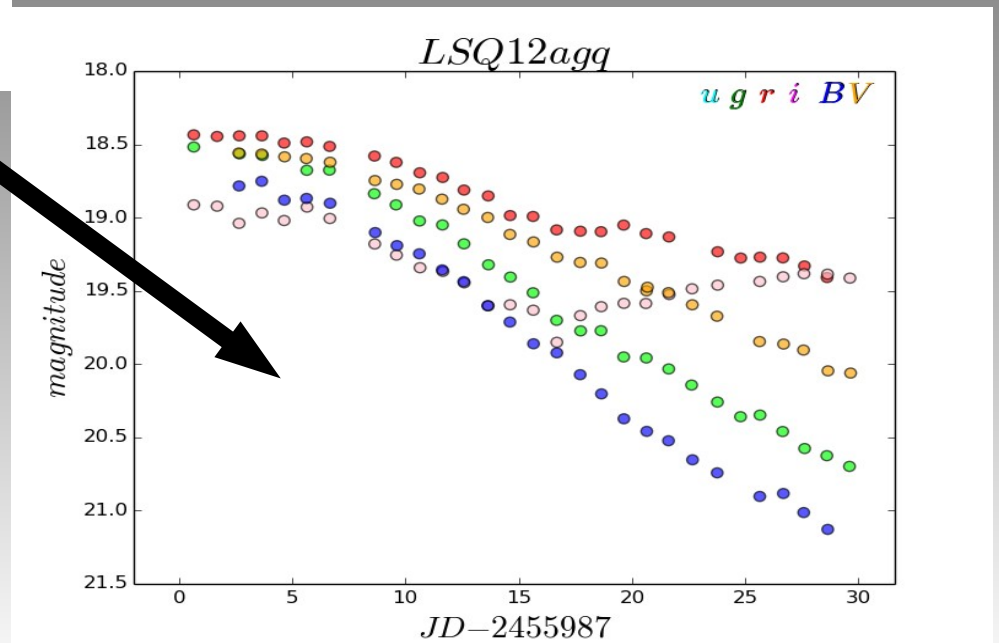
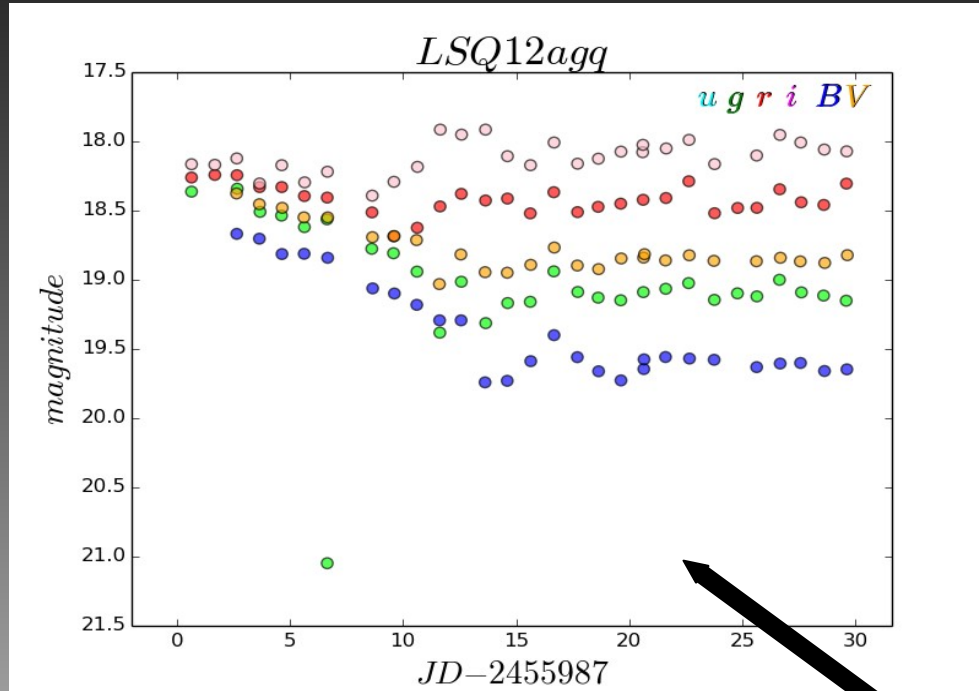
Type Ia:

- DR1: 35 SN Ia (2010)
- DR2: 50 SN Ia (2011).
- ~~• Mark's: 87 % SN Ia published~~
- Mark's: 87 SN published (2/3 of total)
45 SN Ia pending.

Background Subtraction



Background Subtraction

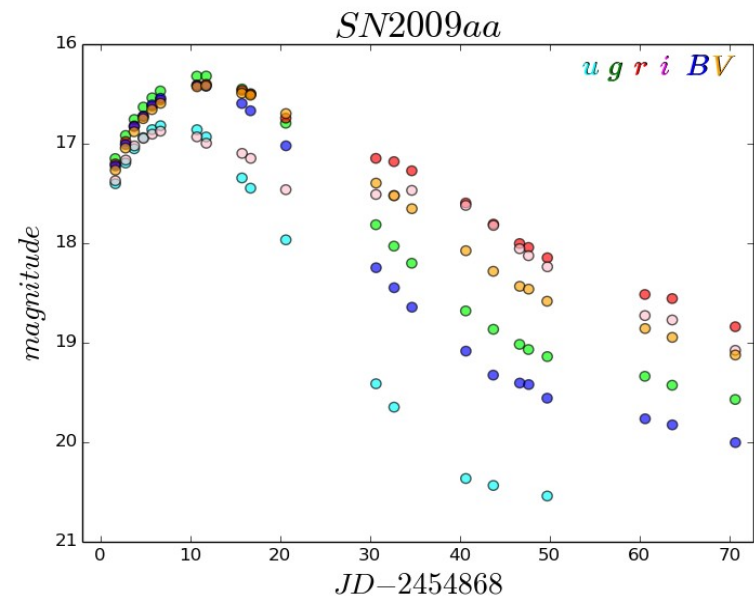
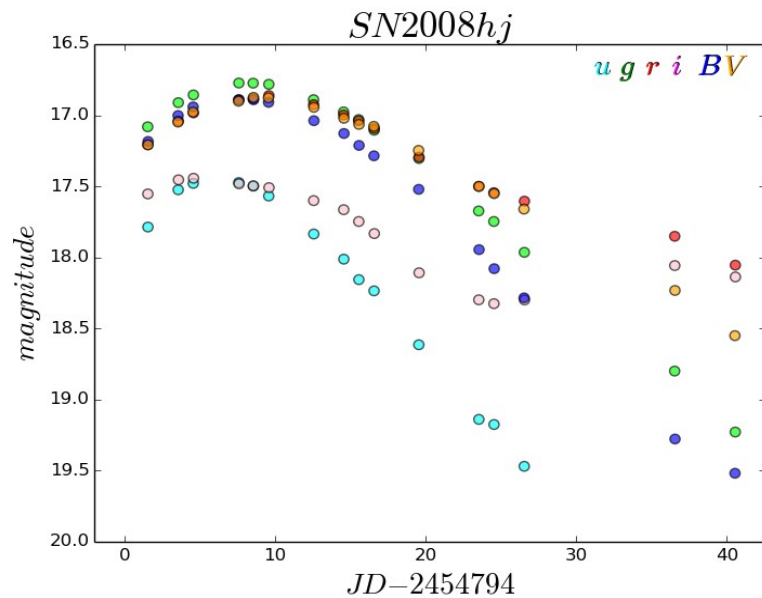
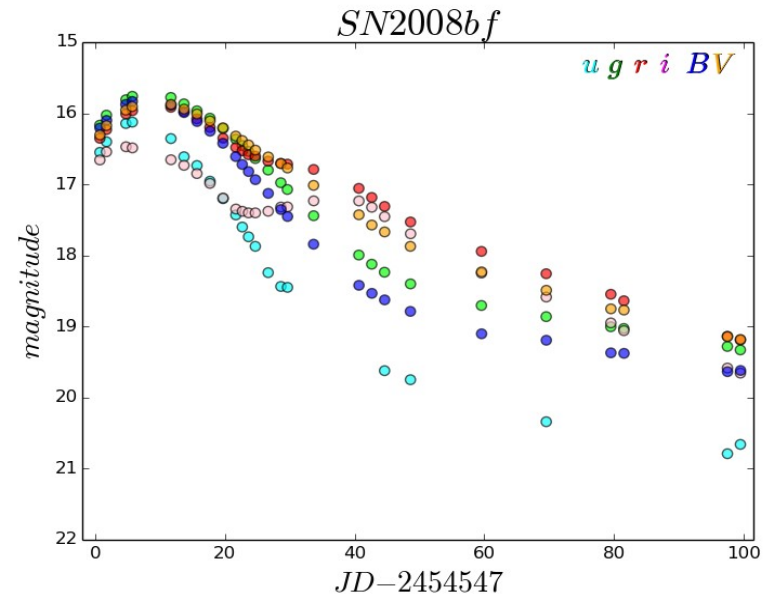
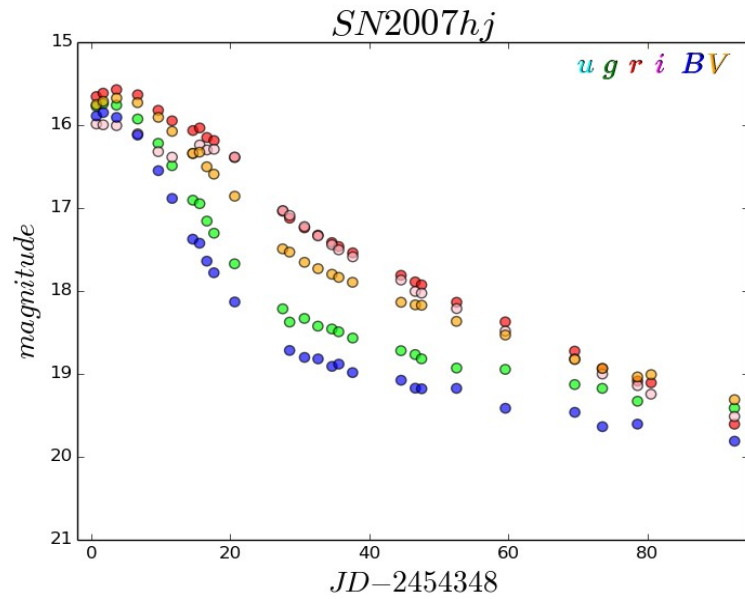


Background Subtraction

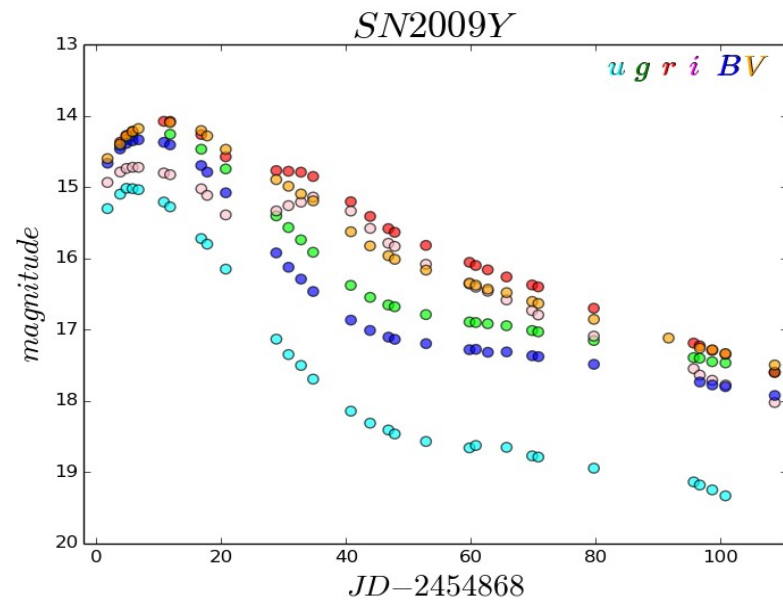
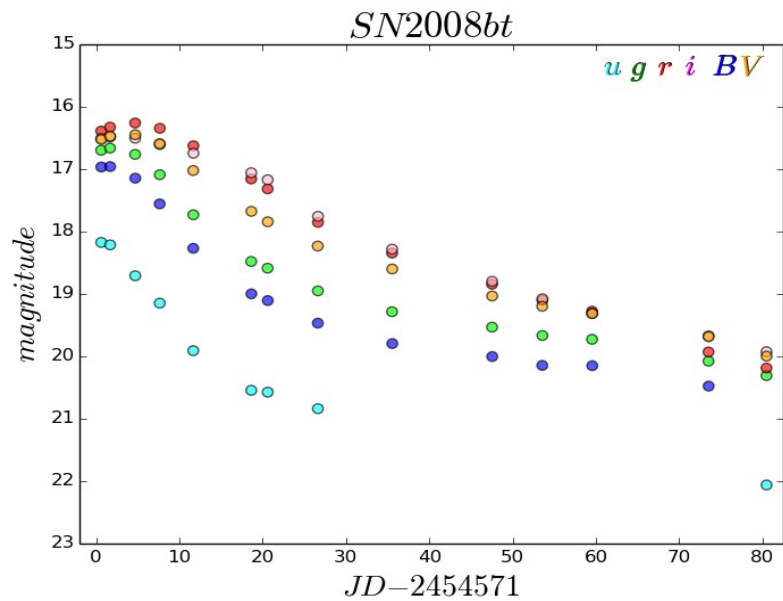
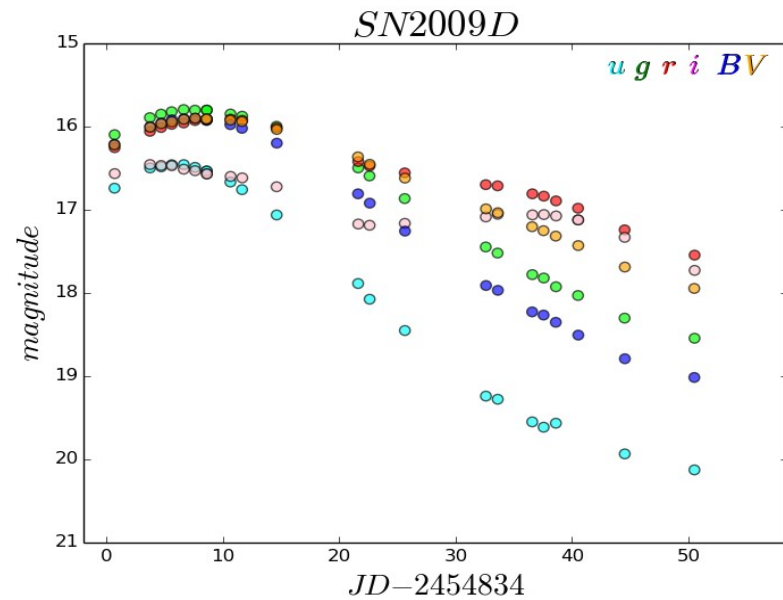
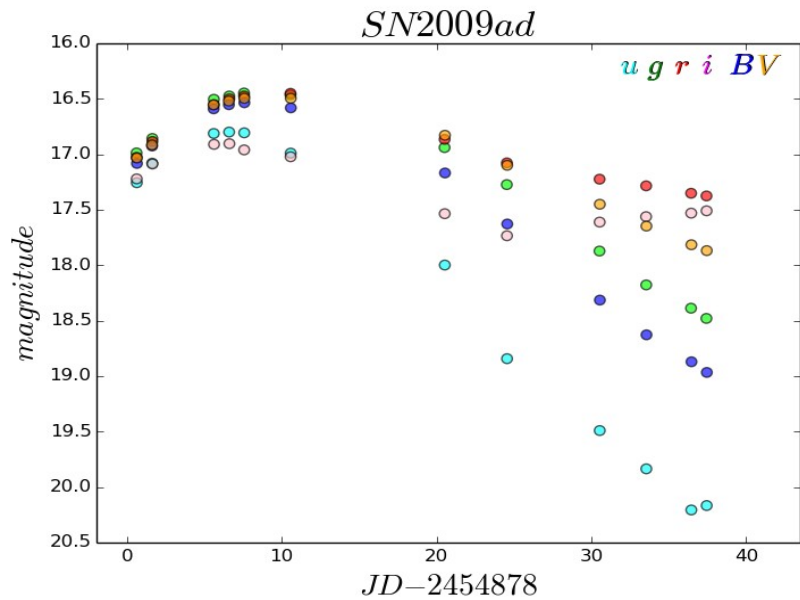
- Who is really doing this work!
- Consuelo Gonzalez and Abdo Campillay



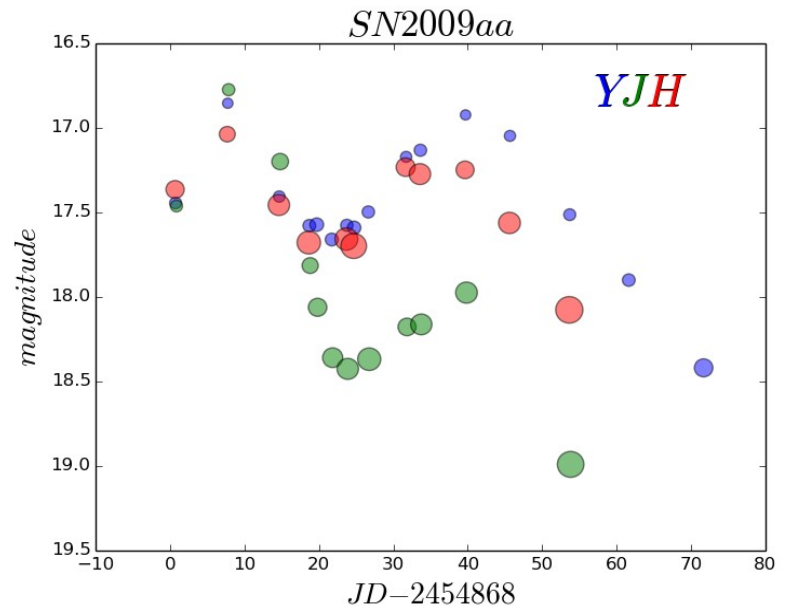
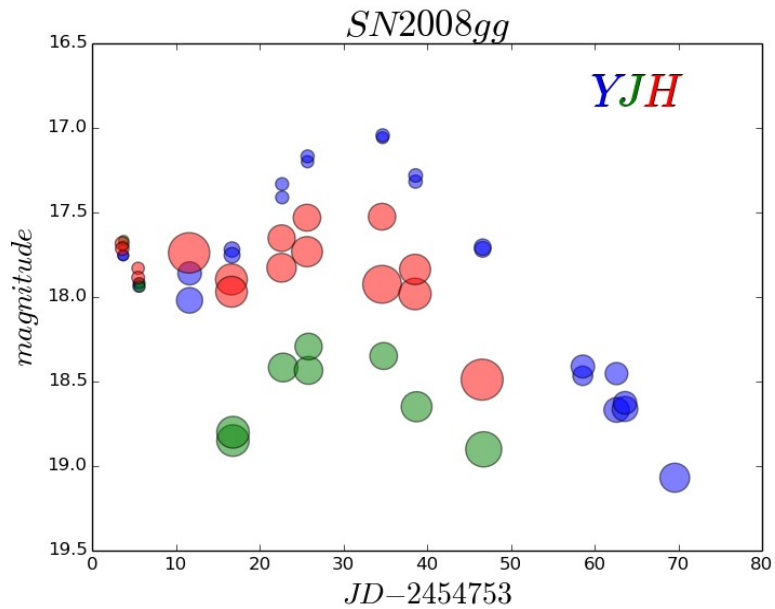
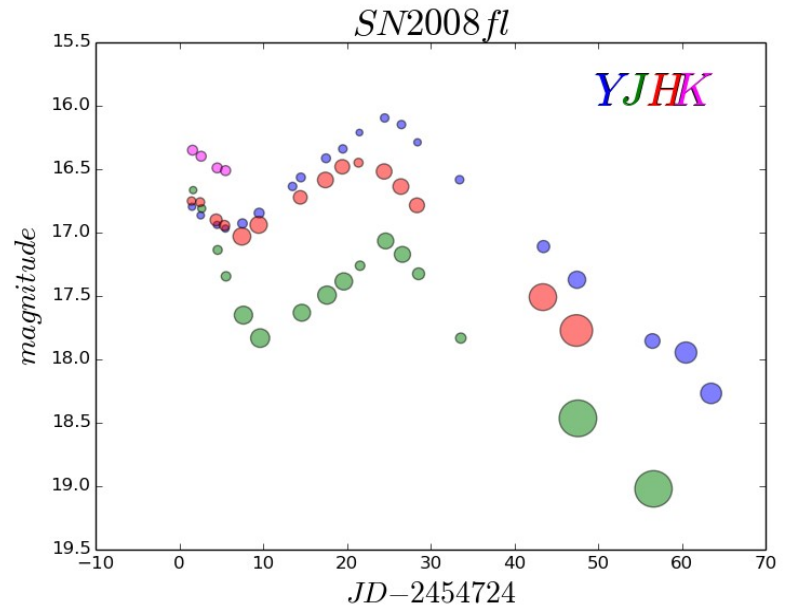
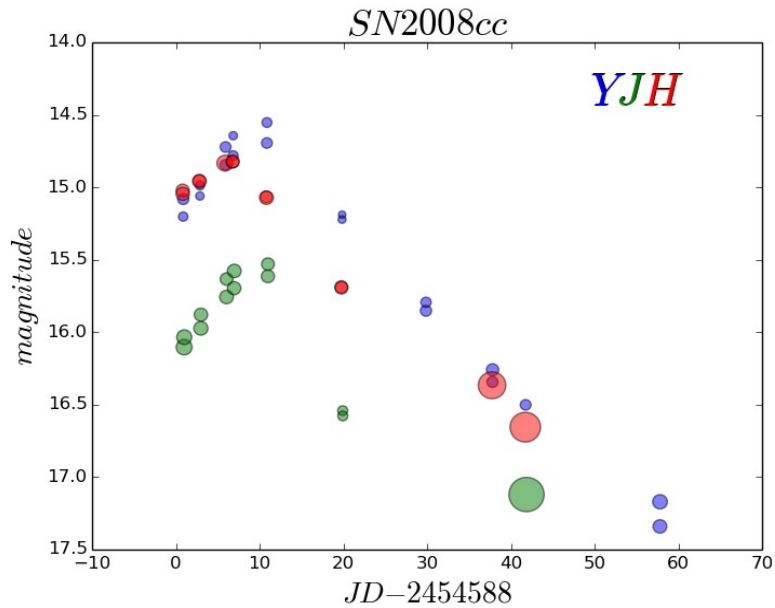
Background Subtraction



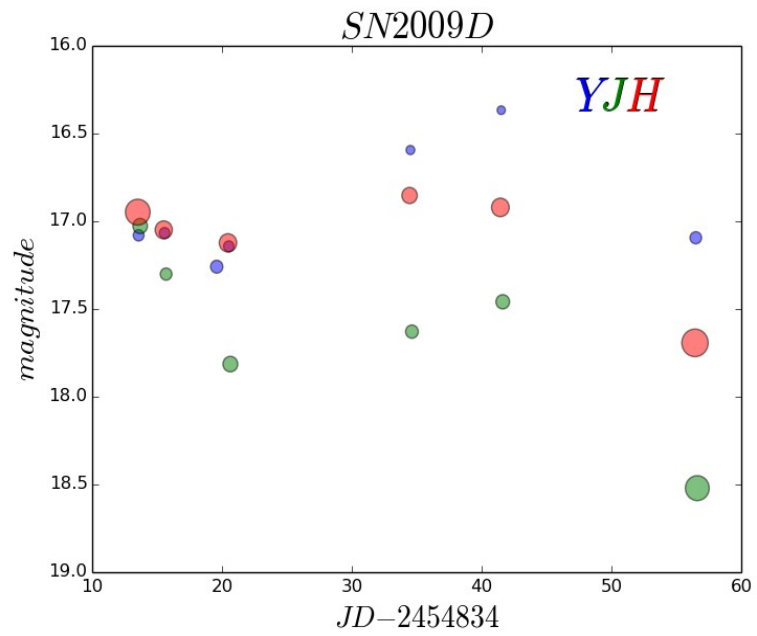
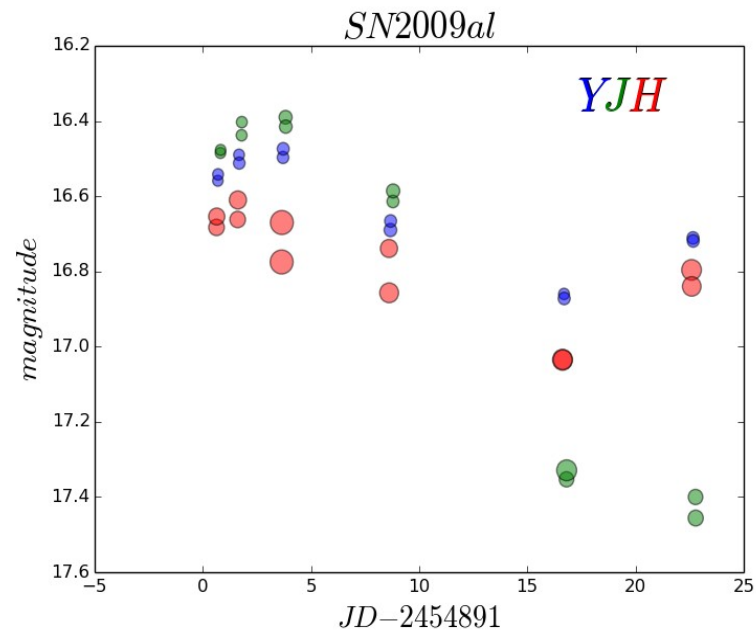
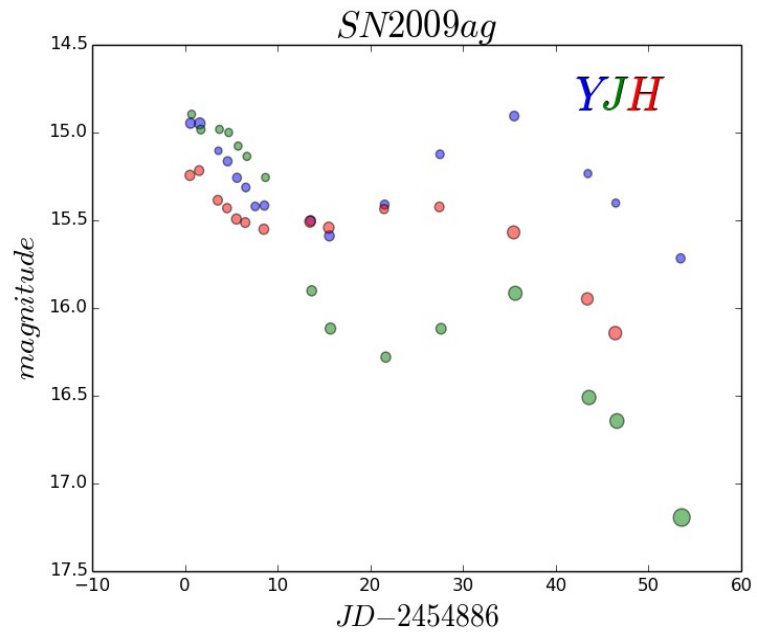
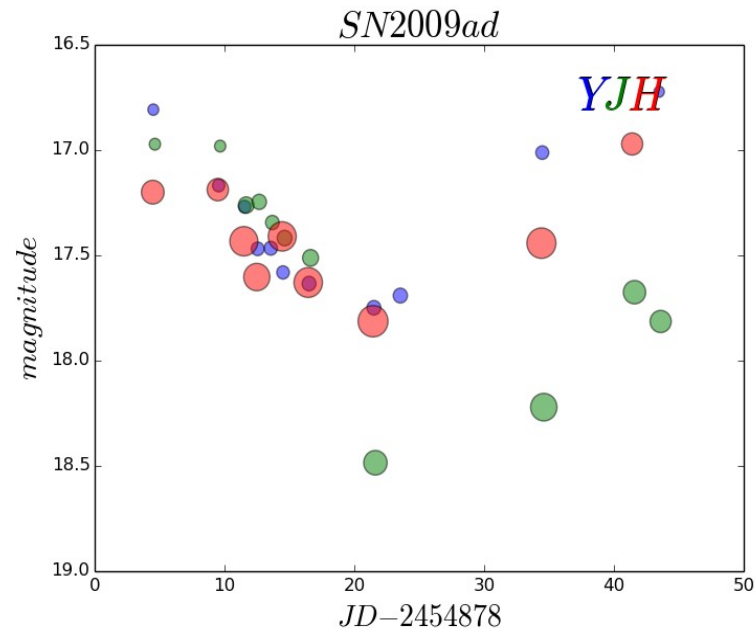
Background Subtraction



Background Subtraction

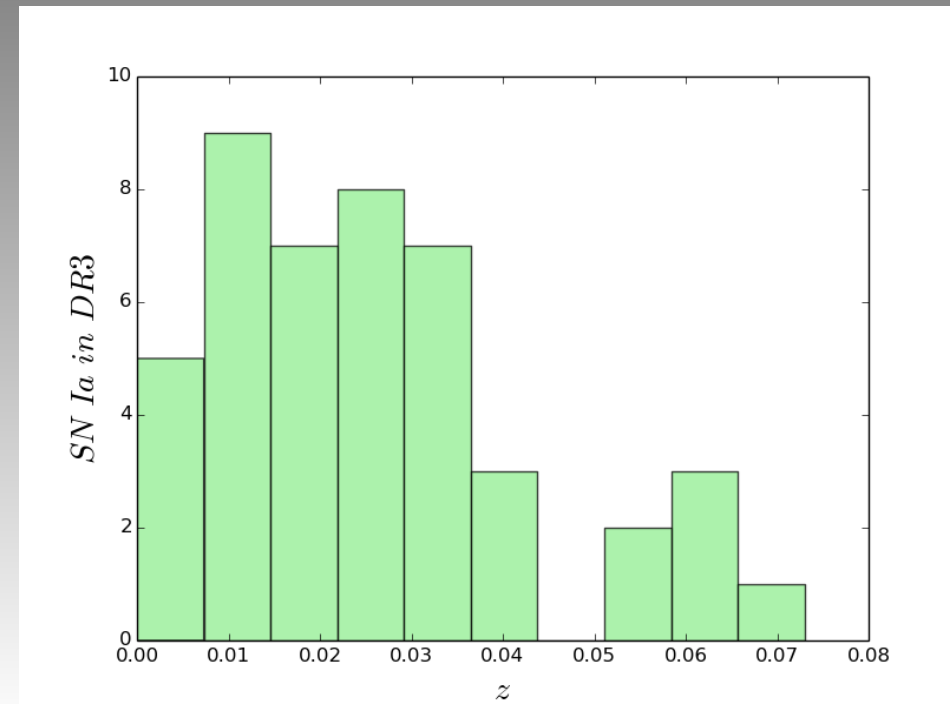


Background Subtraction



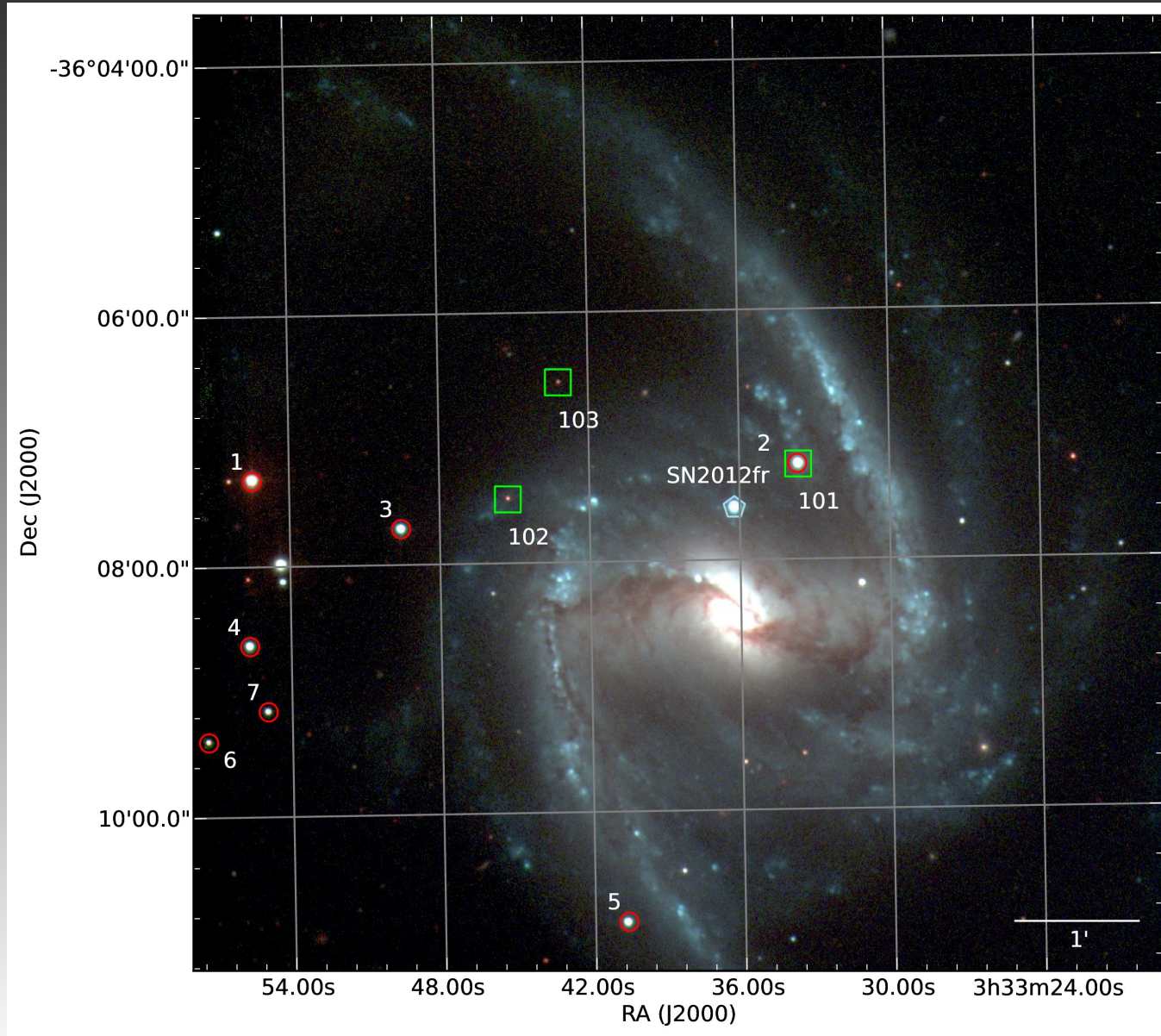
CSP I

- Soon **DR3**:
 - 45 SN Ia
 - 20 with pre-max Opt data
 - Almost all with NIR data
 - red-shift range



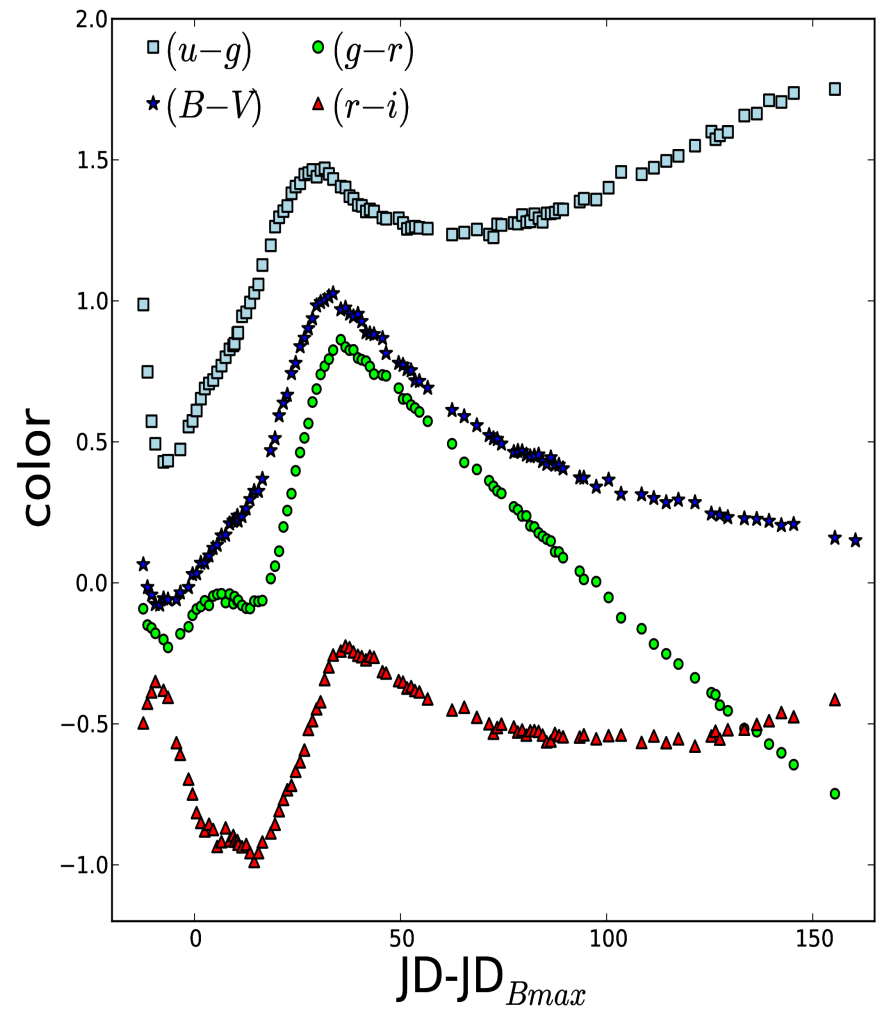
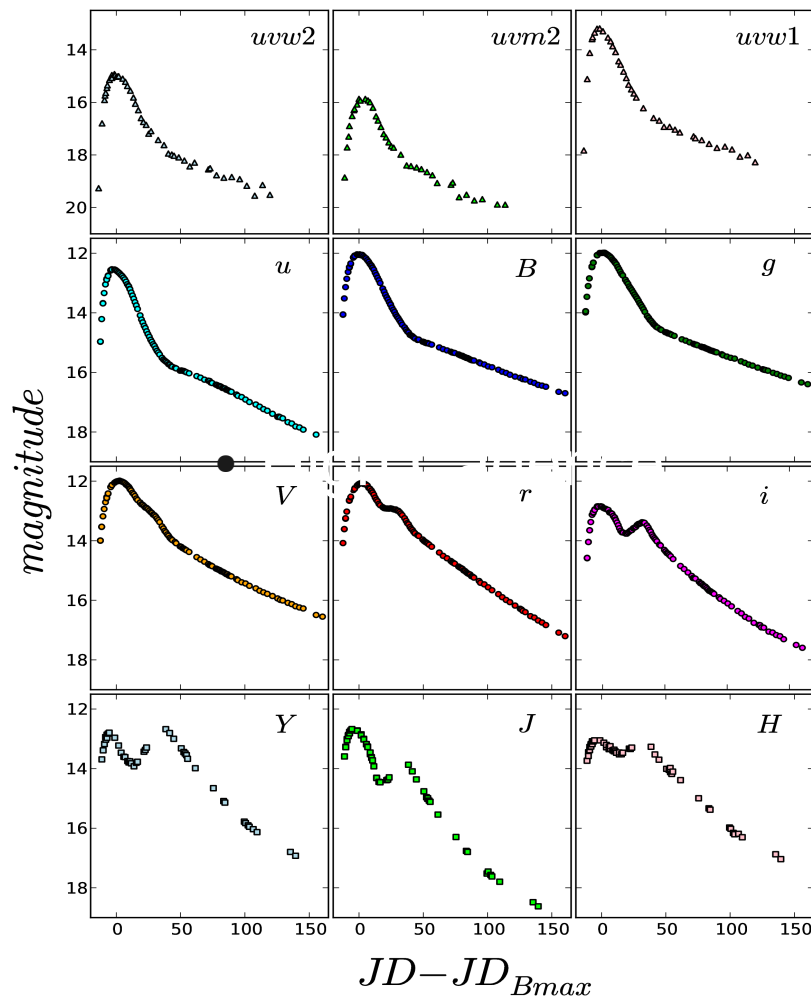
CSP II

CSP II



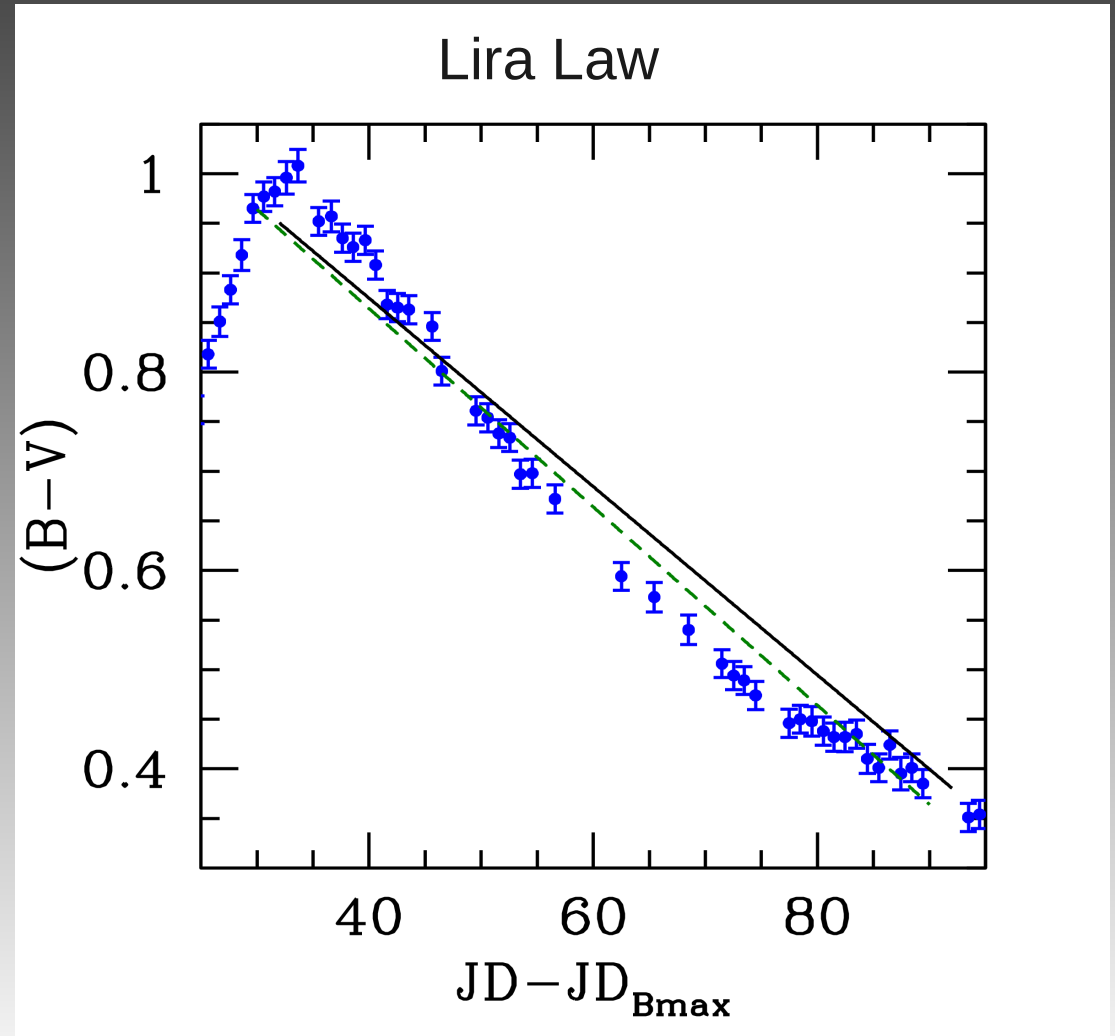
CSP II

- Dense follow-up from 3 days after discovery



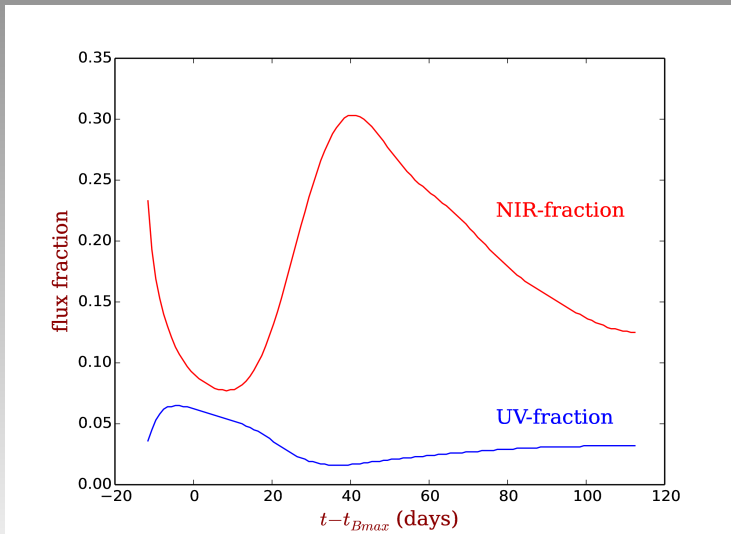
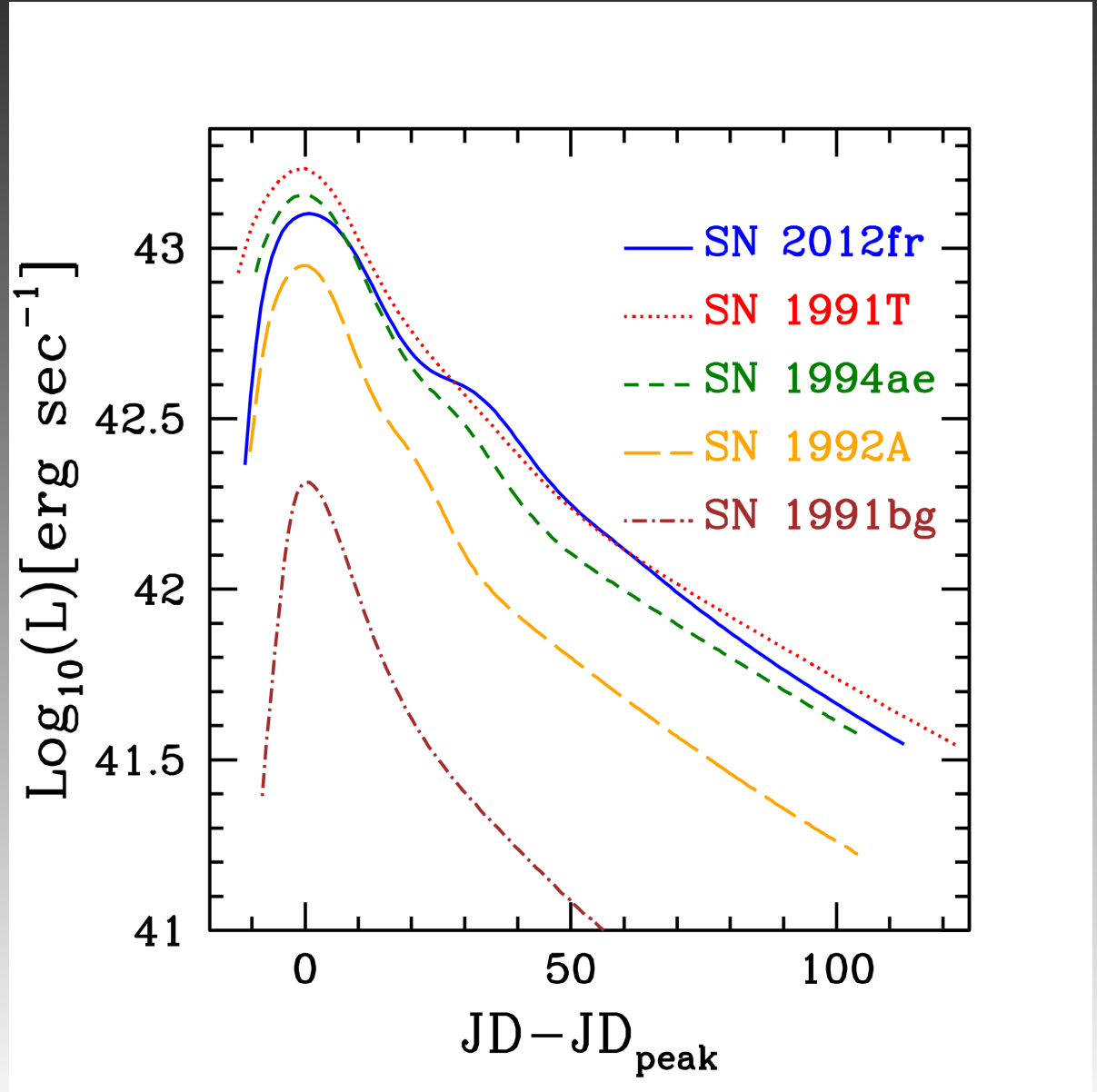
CSP II

- No extinction



CSP II

- High Luminosity
 $dm_{15}(B)=0.82$



CSP II

- SNooPy Analysis:
 - DM = 31.27 ± 0.05 (Cepheids)
 - DM = 31.25 ± 0.03 (SnooPy)
- So, SN2012fr seems NORMAL ...

CSP II

- So, SN2012fr seems NORMAL ... but SPECIAL ...

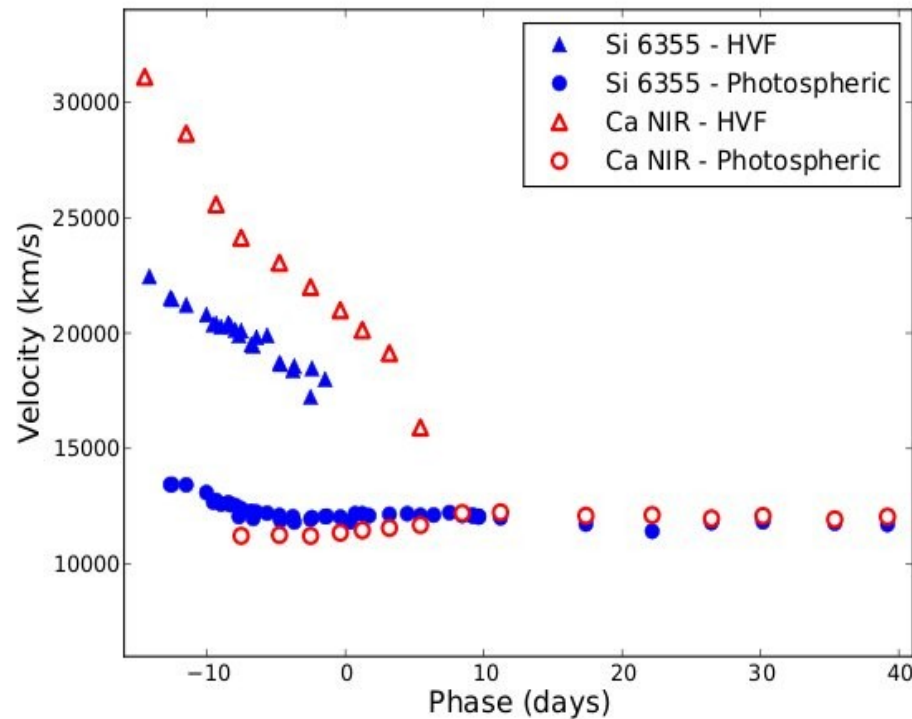


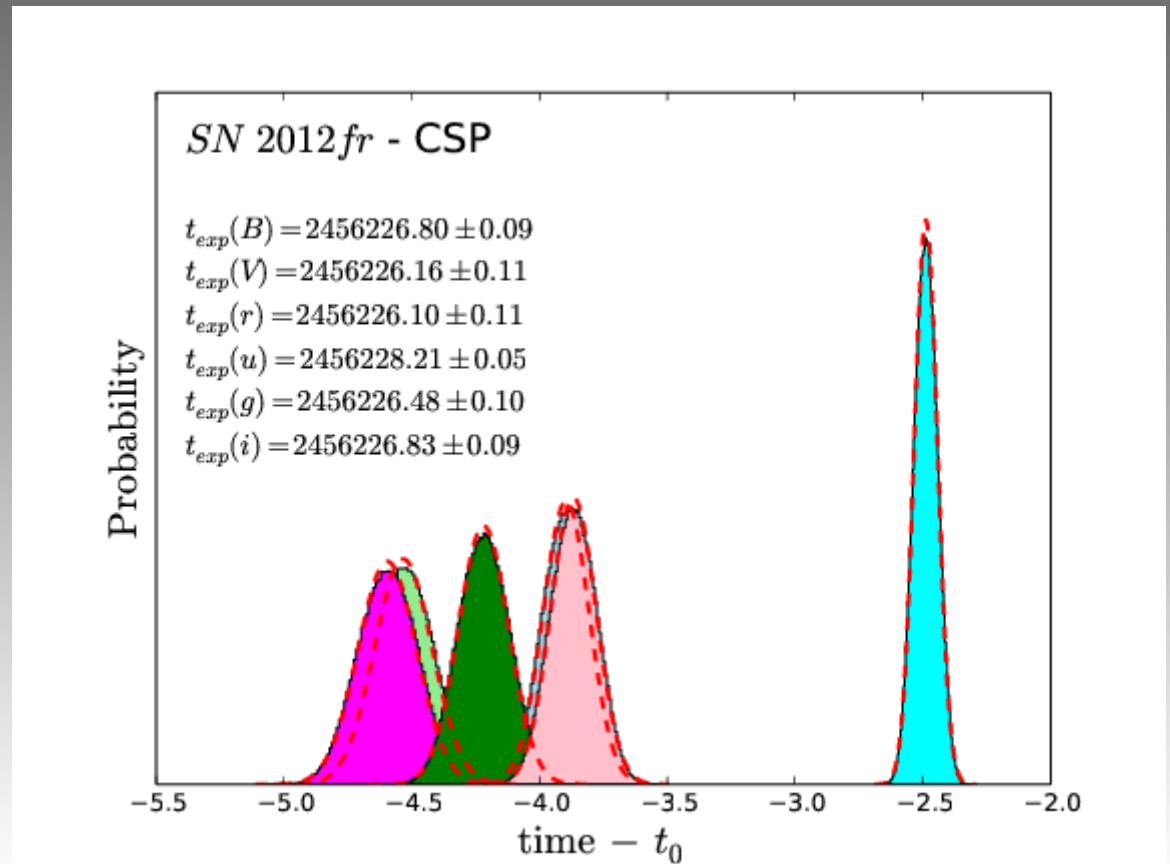
Figure 11. Velocity evolution of the high-velocity (triangles) and photospheric (circles) components of the Ca II IR triplet (open red symbols) in SN 2012fr compared to that of the Si II λ 6355 line (filled blue symbols).

Childress et al 2013

CSP II

- Rise Time:

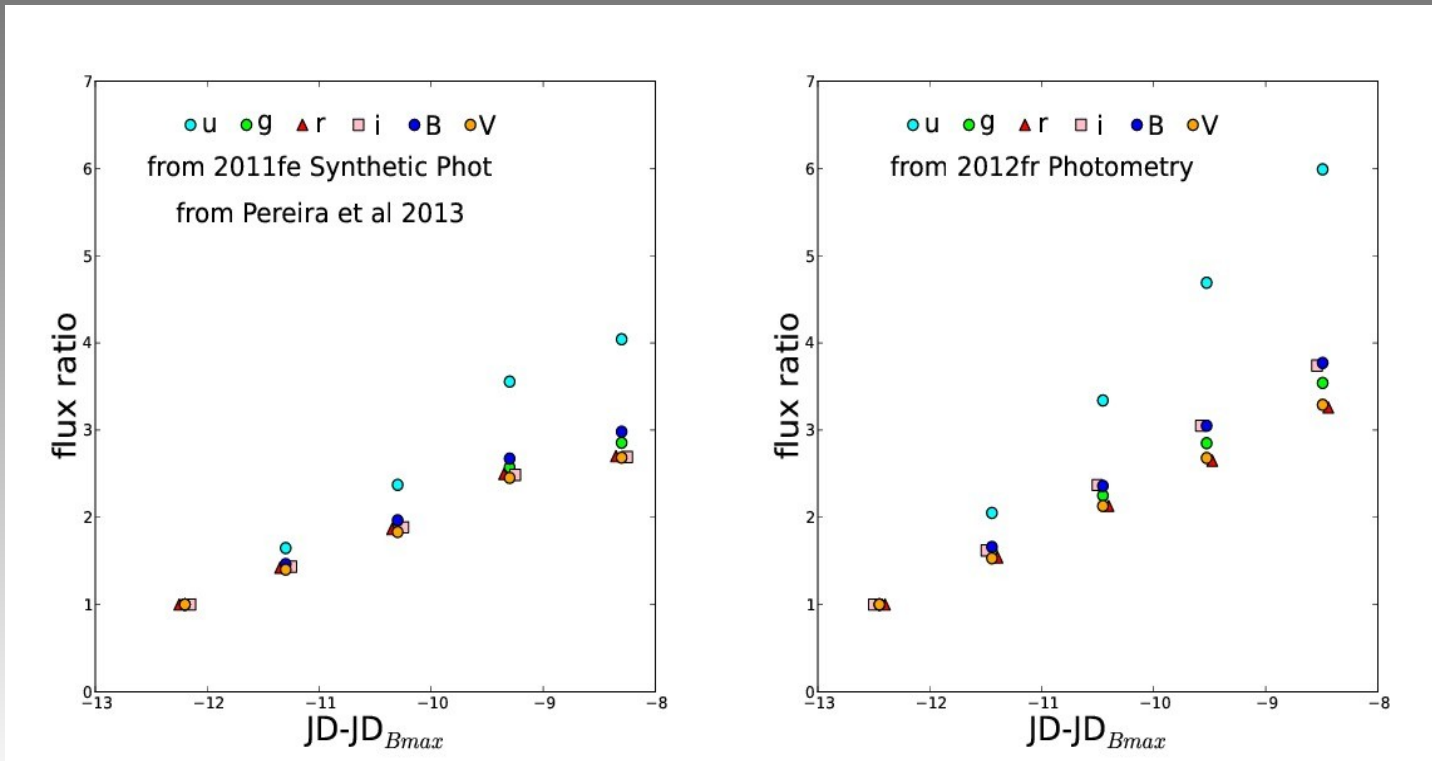
Fireball Model : $\text{flux} = A (t - t_0)^2$



CSP II

- Rise Time:

Fireball Model : $\text{flux} = A (t - t_0)^2$



CSP II

- Rise Time:

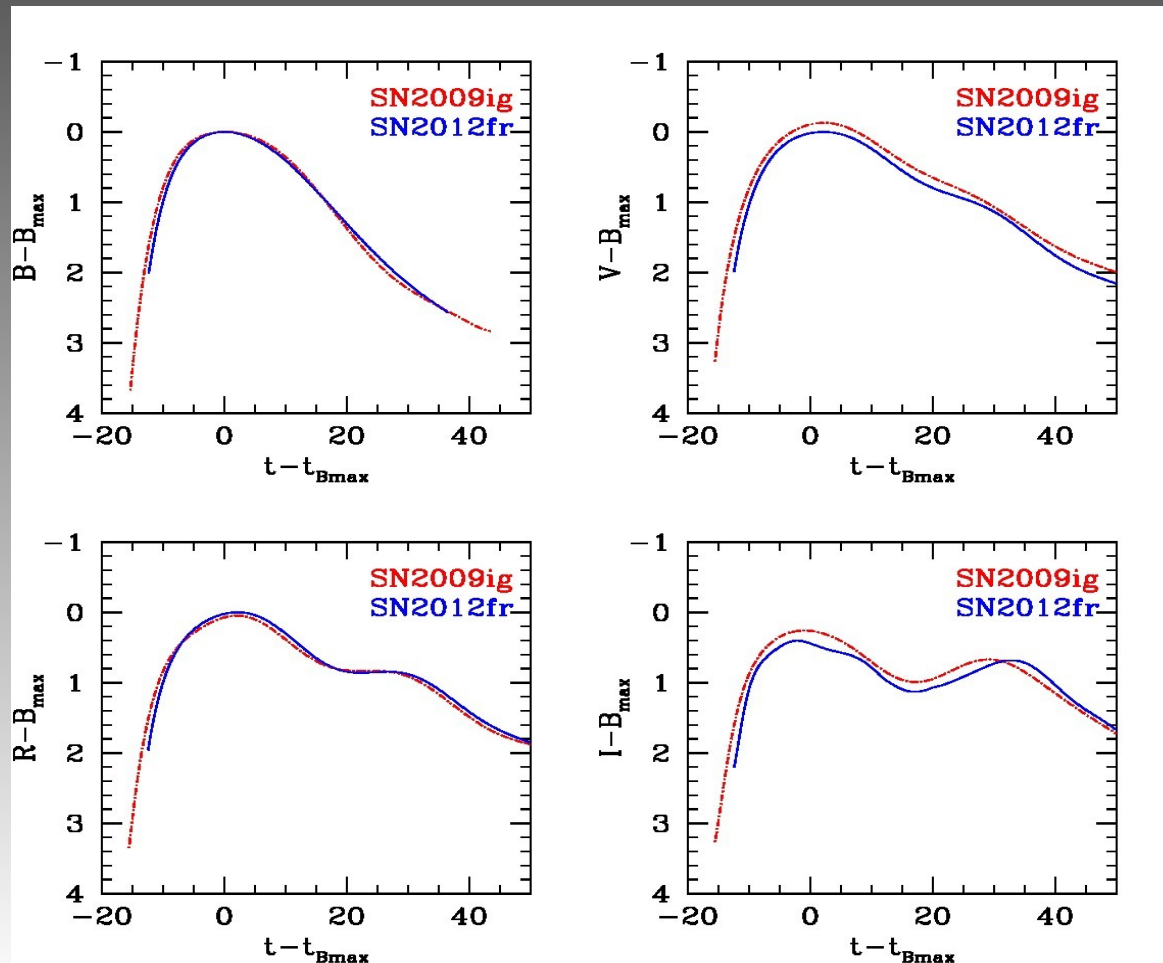
Fireball Model : $\text{flux} = A (t - t_0)^2$

- Fireball model may not apply to all SN Ia
- More than 1 band should be considered in analyses.

So far, using fireball model we get rise time = 16.8 days

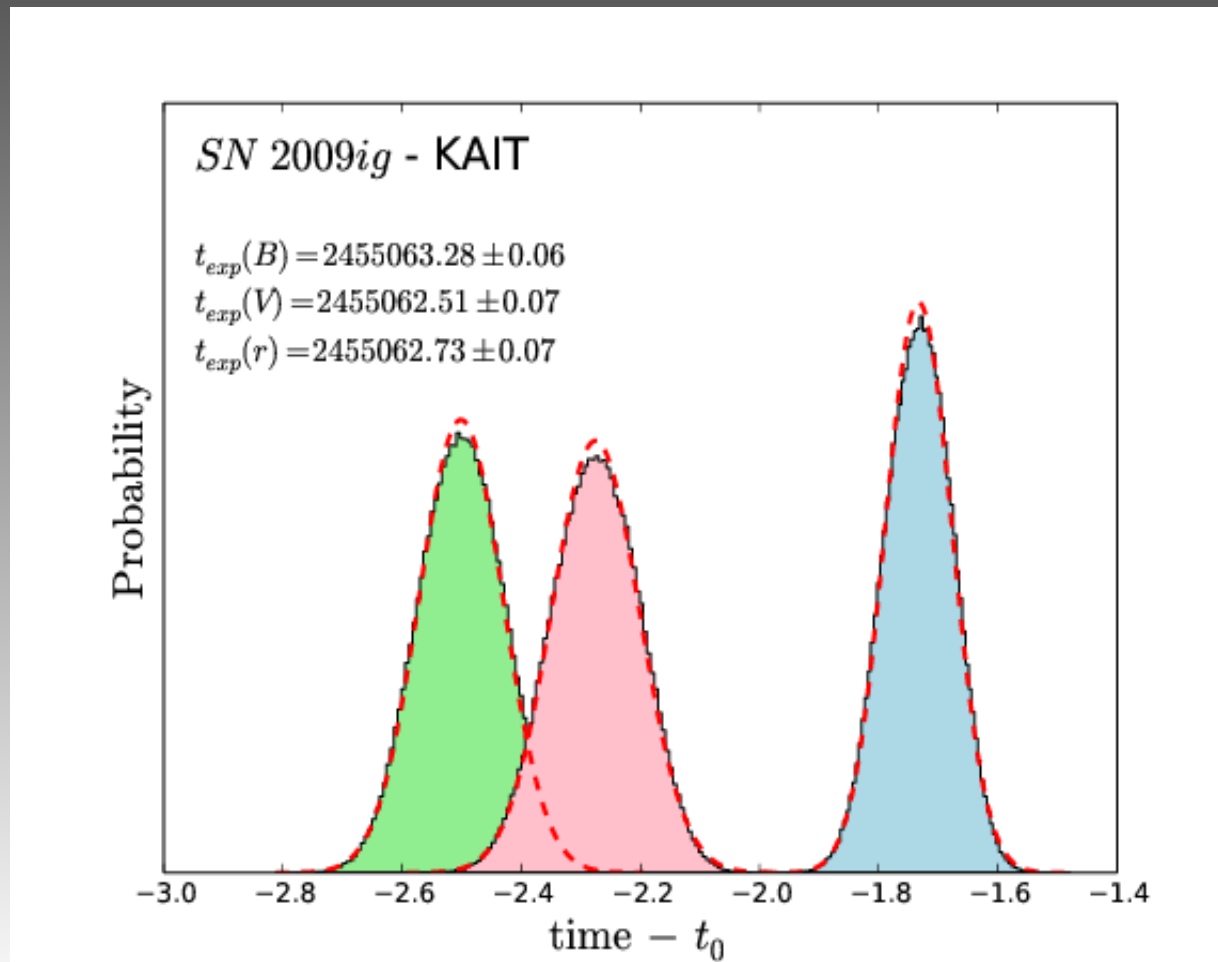
CSP II

- SN2012fr has a twin: SN2009ig



CSP II

- SN2012fr has a twin: SN2009ig



CSP II

- End

CSP II