DEFINING PHOTOMETRIC SUBLUMINOUS SNe Ia

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With: Eric Hsiao, Gaston Folatelli, Francisco Forster

Subluminous SNe Ia

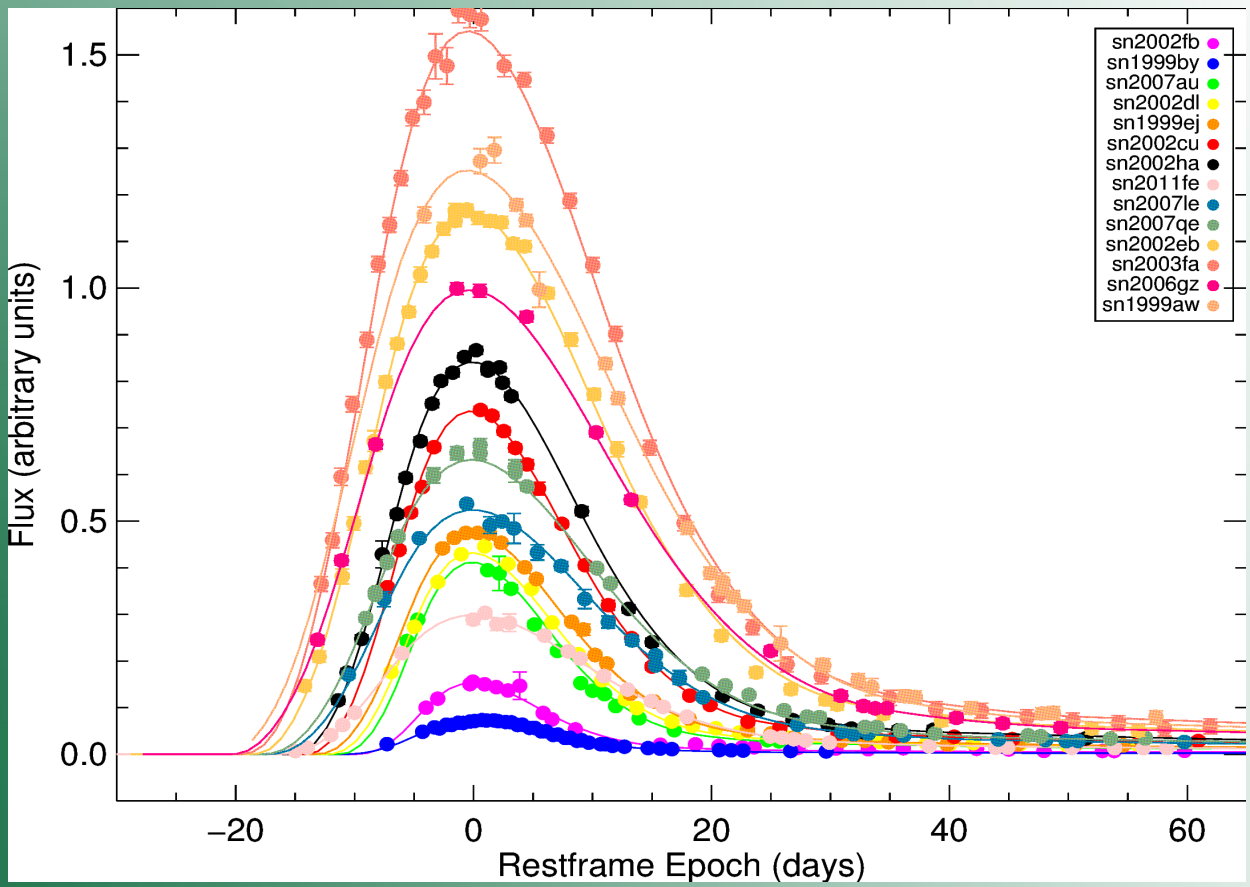
Light-curve:
Faint

Fast

Red

Spectra:
Strong Ti II

Enhanced Si II



Subluminous SNe Ia

- “Peculiar” SNe left out in cosmology
- ~17 % (Li et al. 2010)
- Occur in passive E/S0 galaxies
- Very little Ni mass: <0.1Ms
- Normal theoretical models can't account

→ Two different channels?
→ Different progenitor scenarios?

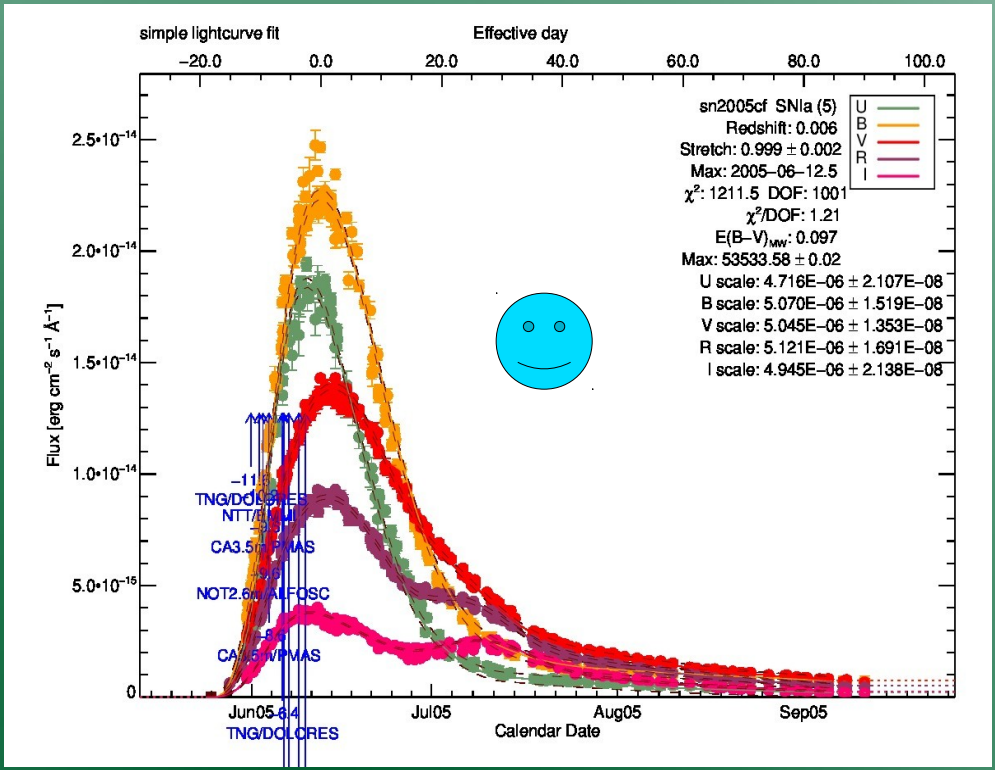
SiFTO fits to low-z SNe Ia with 2 templates

Fit with SiFTO (Conley et al. 2008) to low-z SNe Ia from literature with two templates:

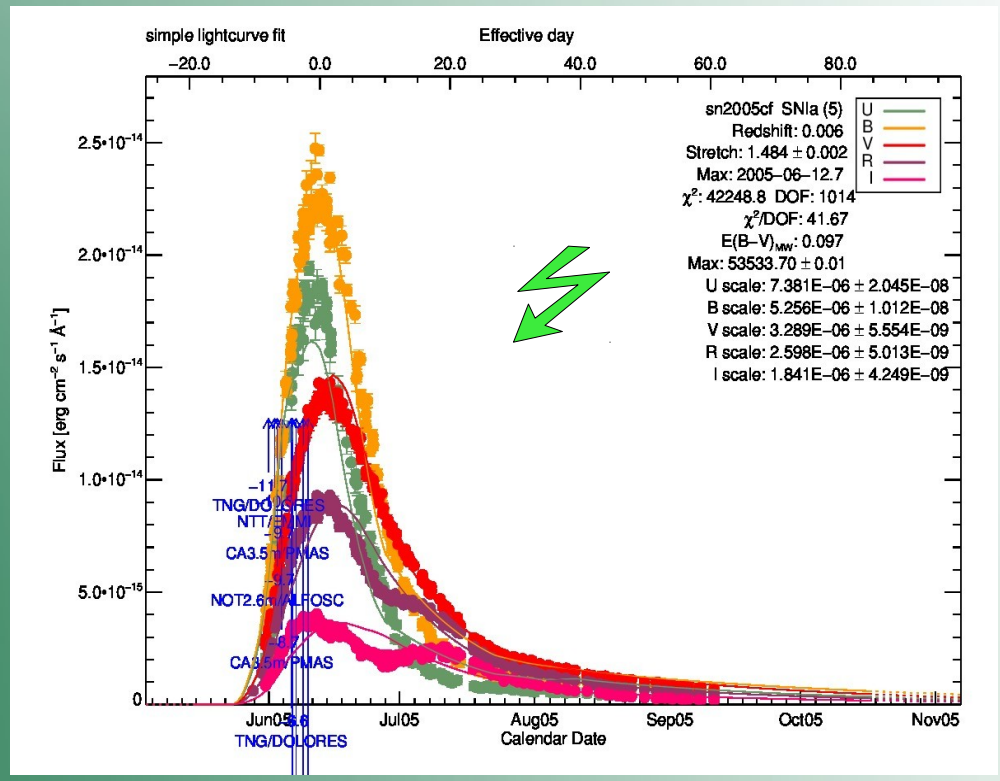
1) Normal Ia template from Hsiao et al. (2007)
2) Sublumionus Ia template from Nugent et al. (2002): http://supernova.lbl.gov/~nugent

SiFTO fits to low-z SNe Ia with 2 templates

NORMAL IA FIT



SUB IA FIT



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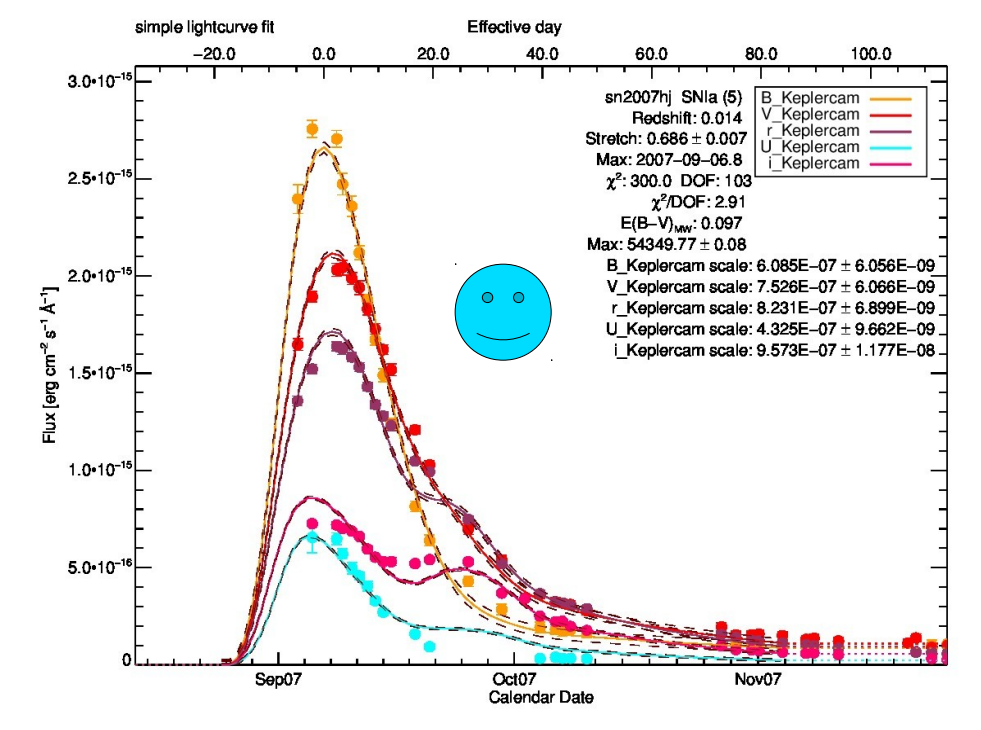

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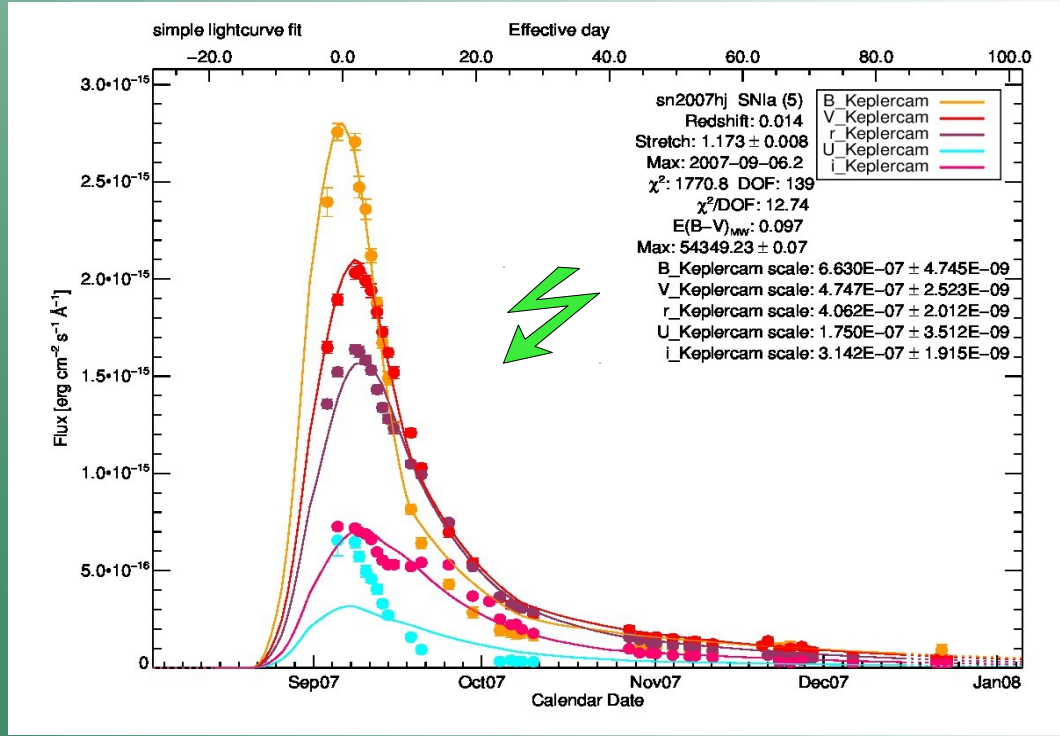

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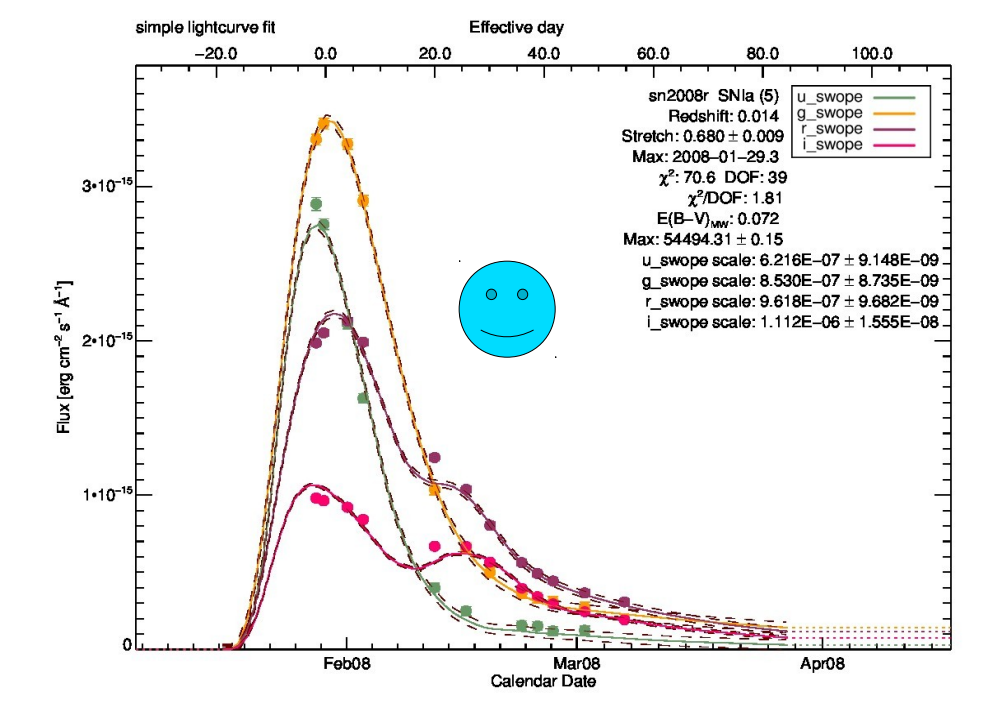

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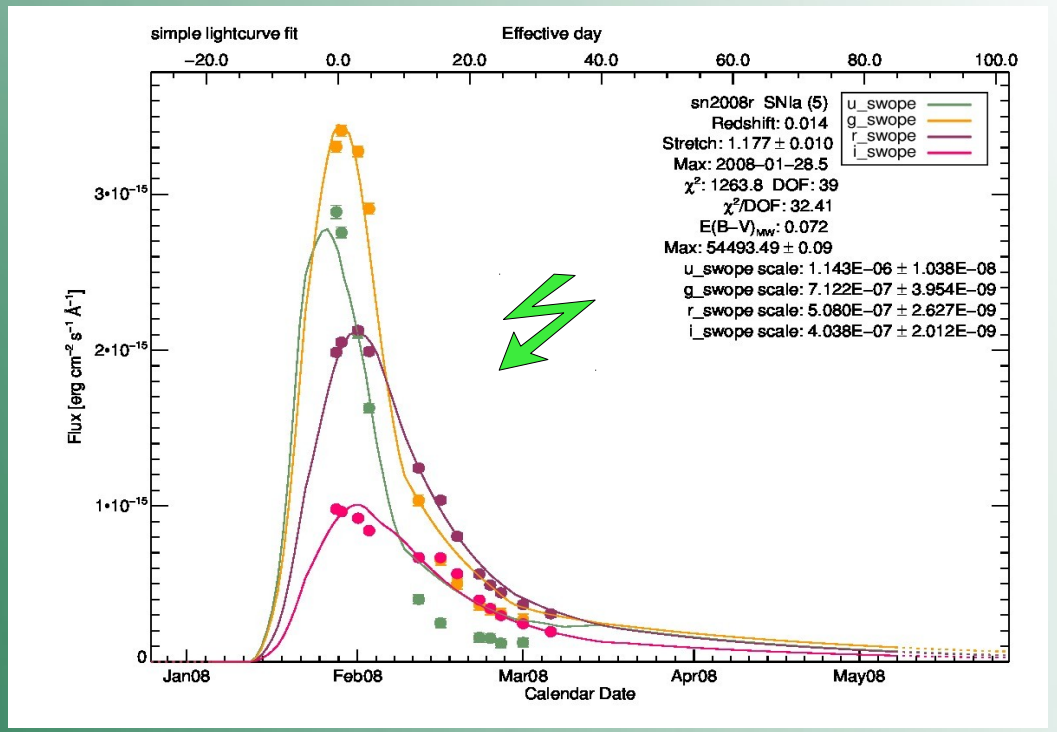

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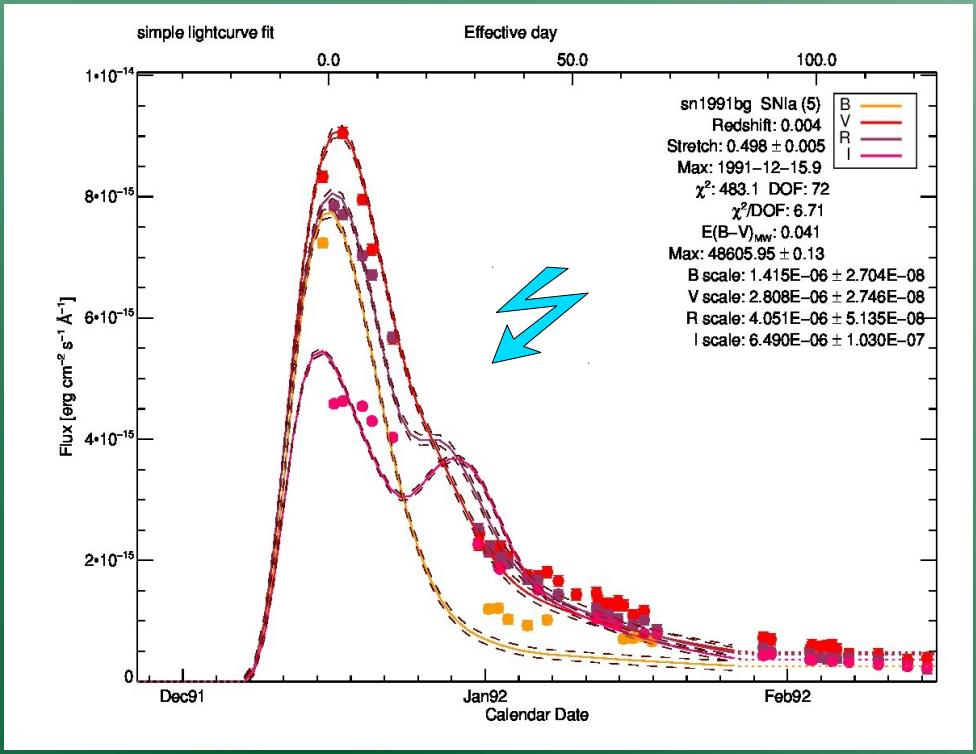
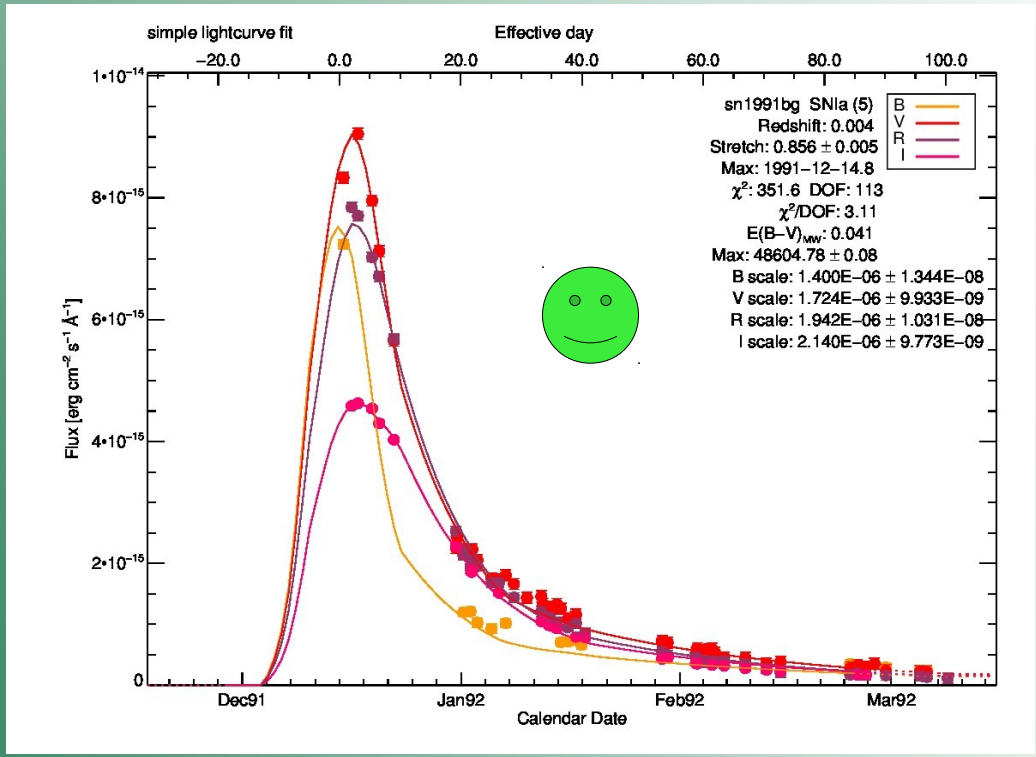


SUB IA FIT



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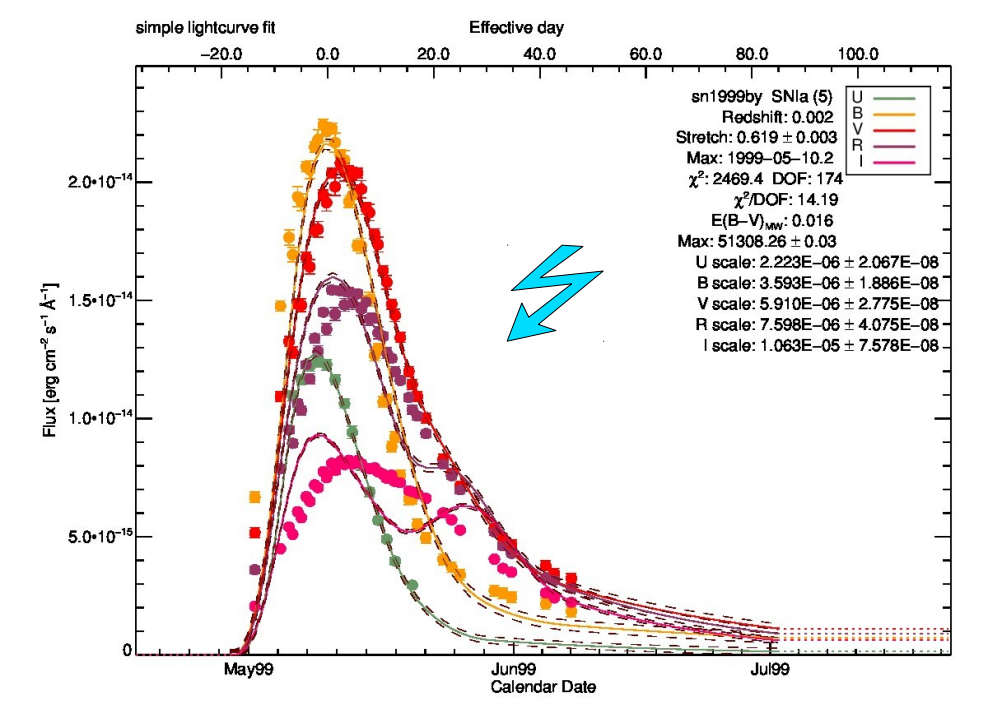

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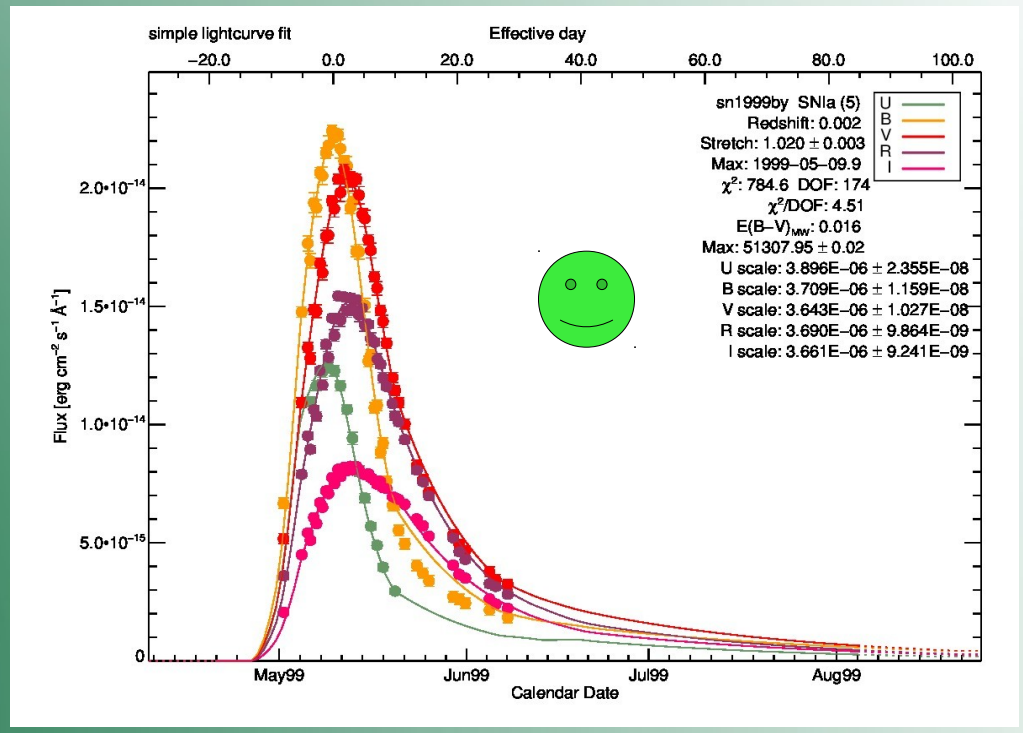

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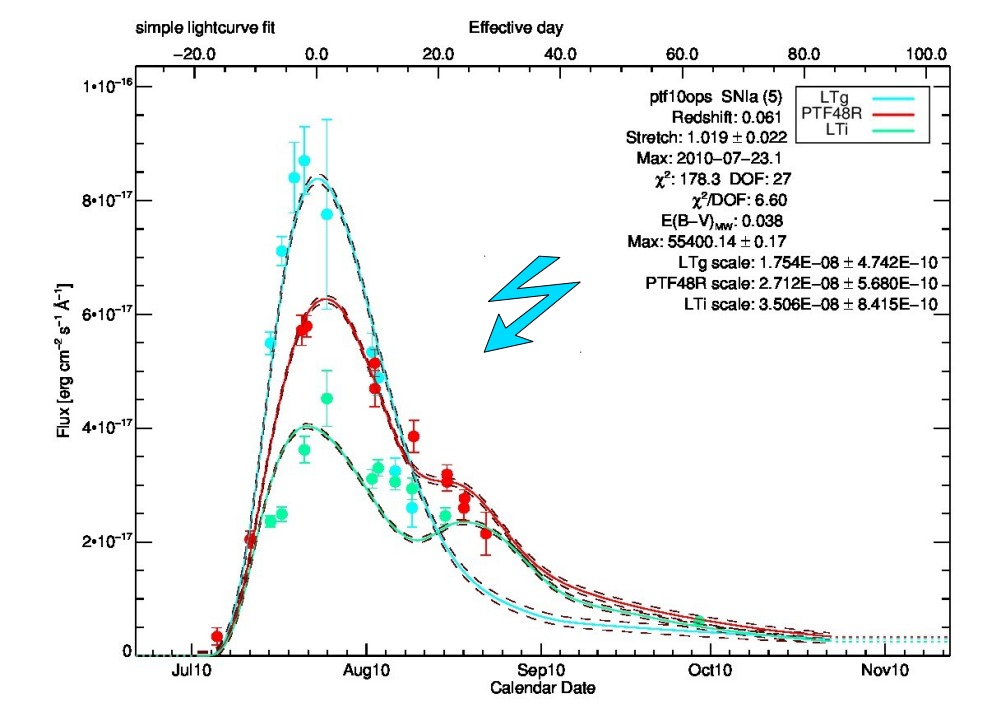

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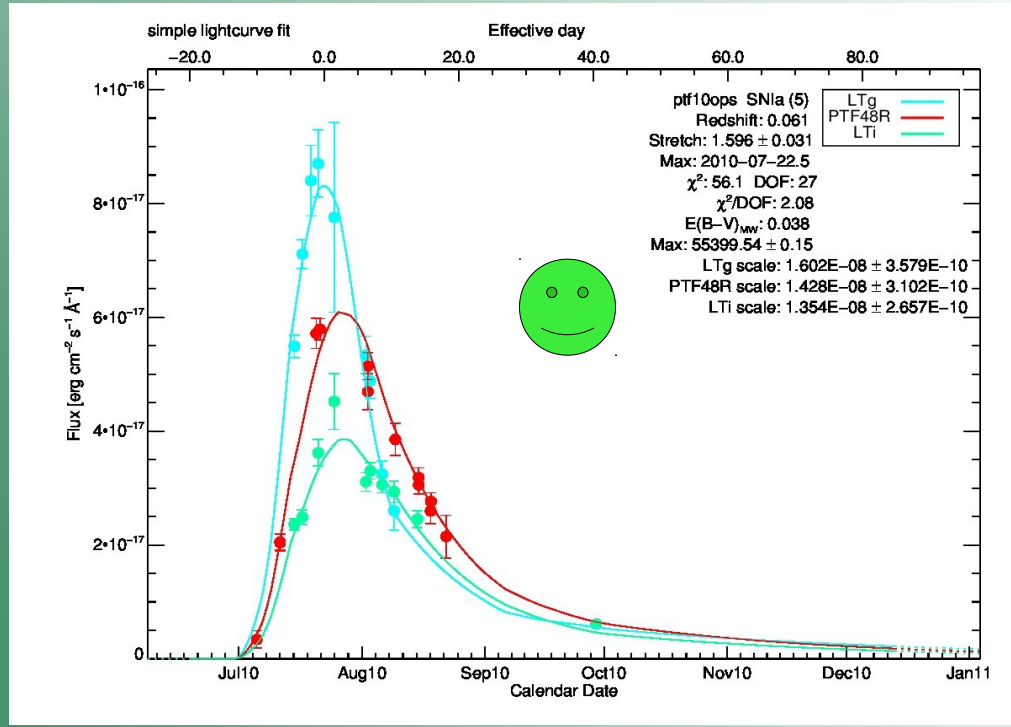
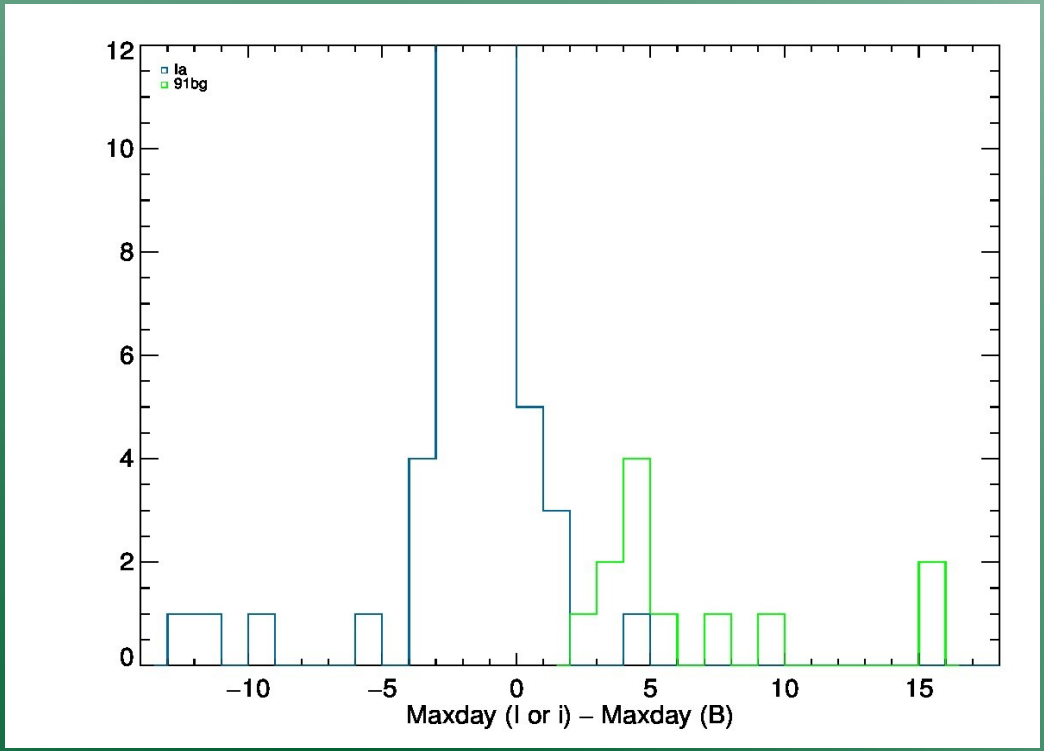
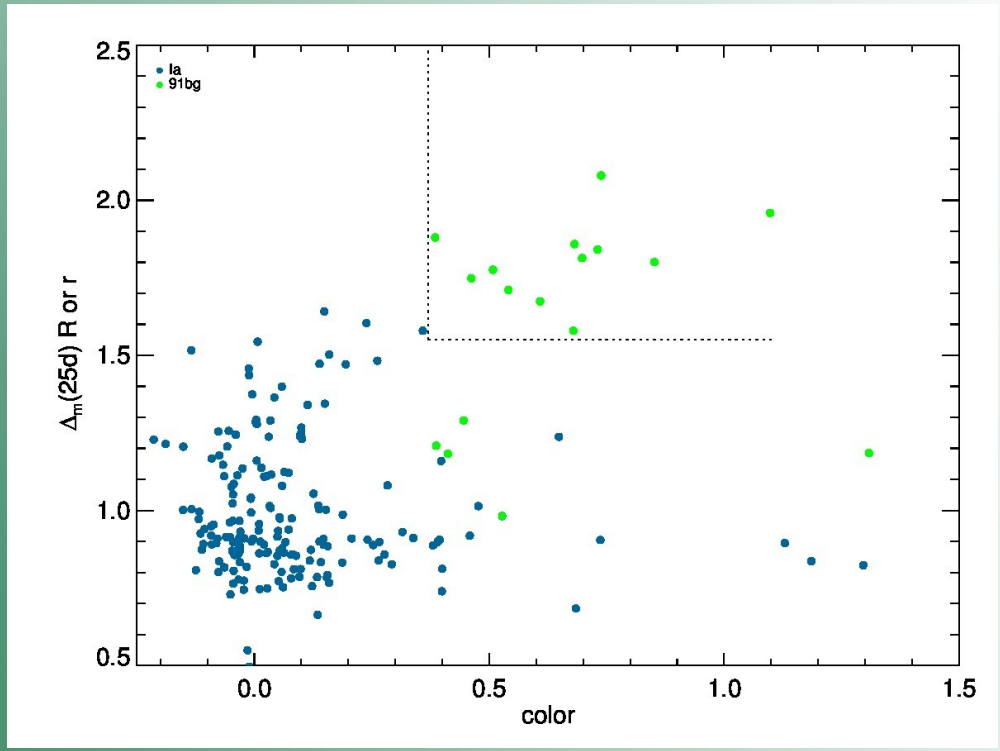


Maguire et al. 2011

Validation of the method trough other LC parameters

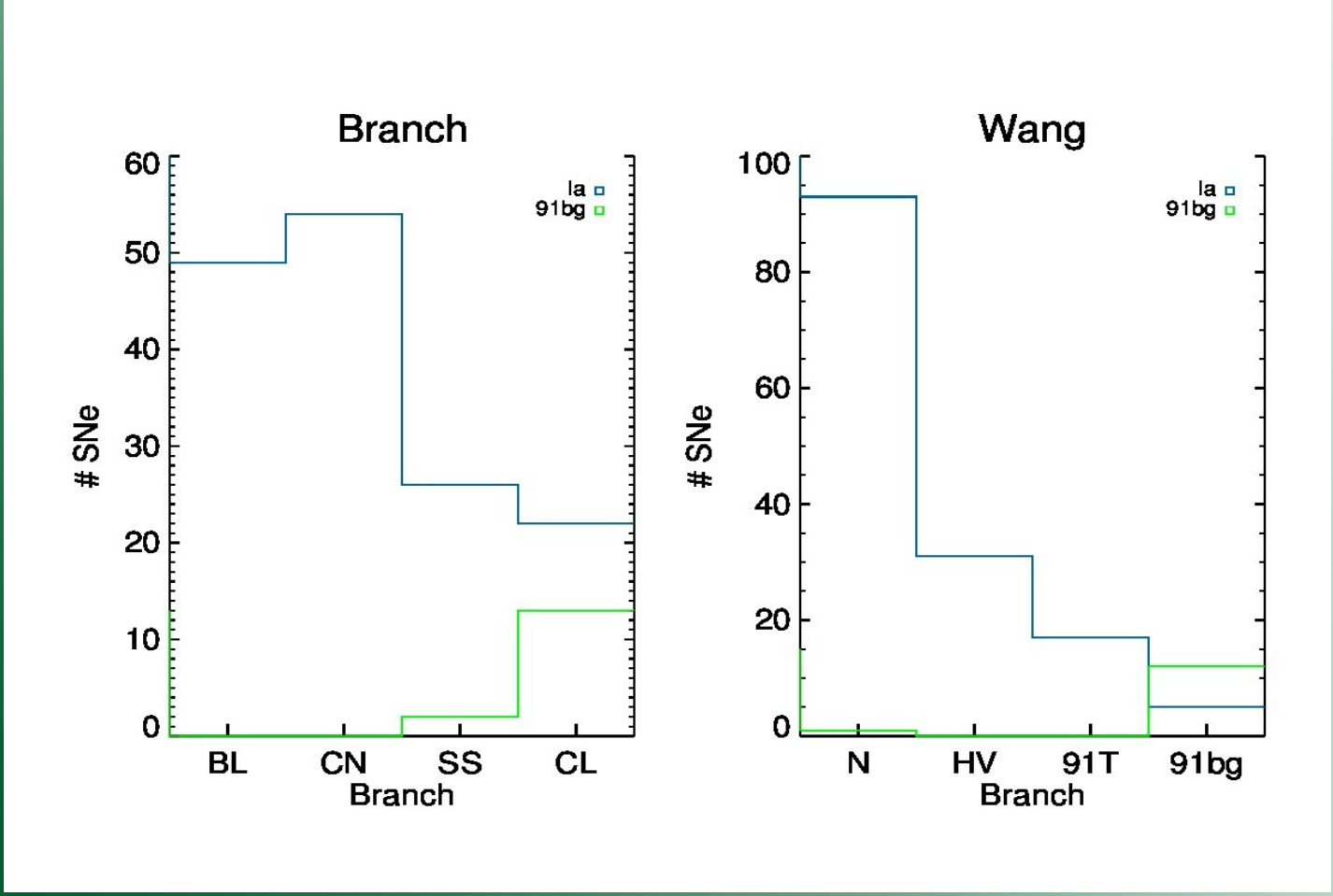


Polynomial fits to get maximum in different bands

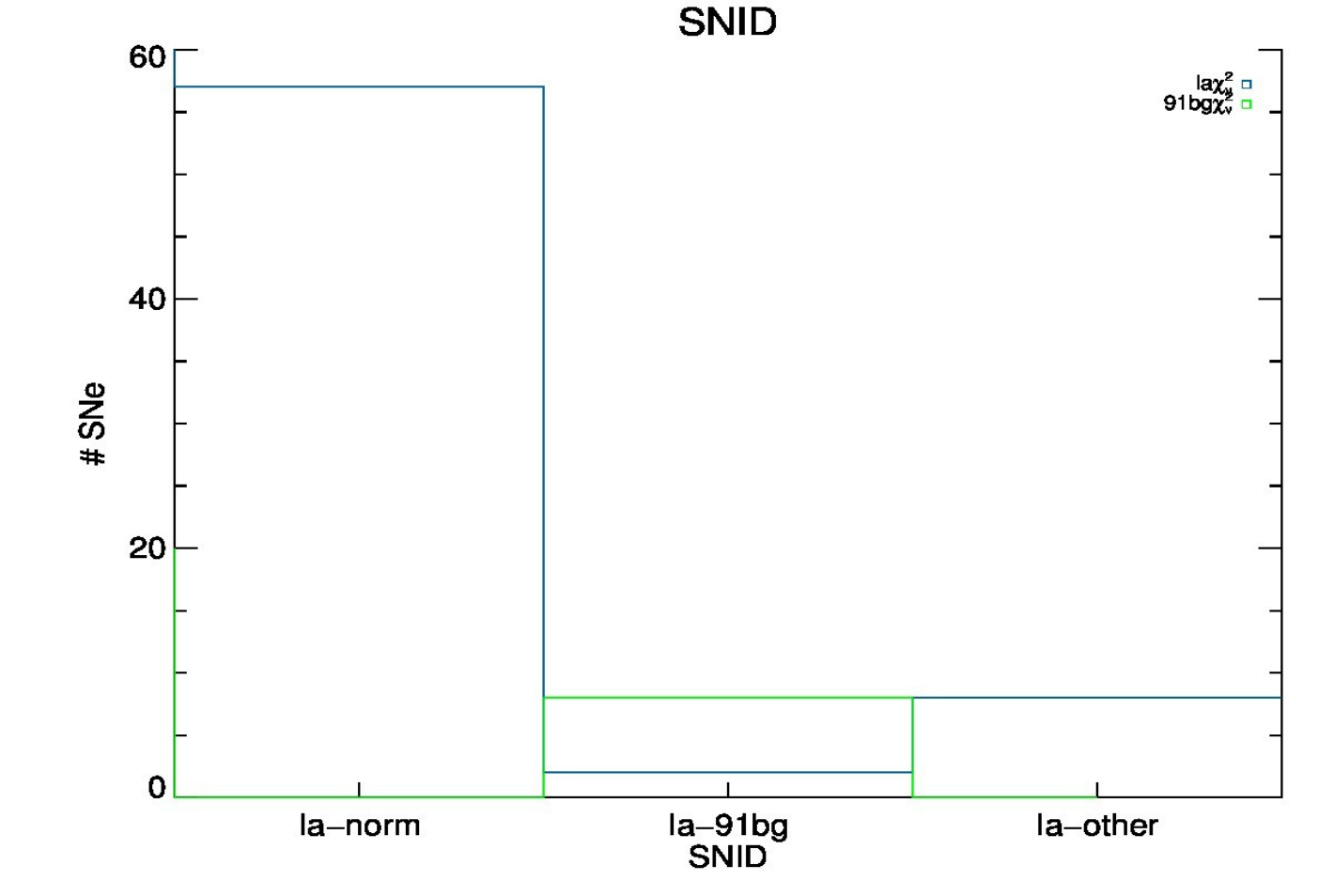


Dm25 = decline in mags after 25d in R/I

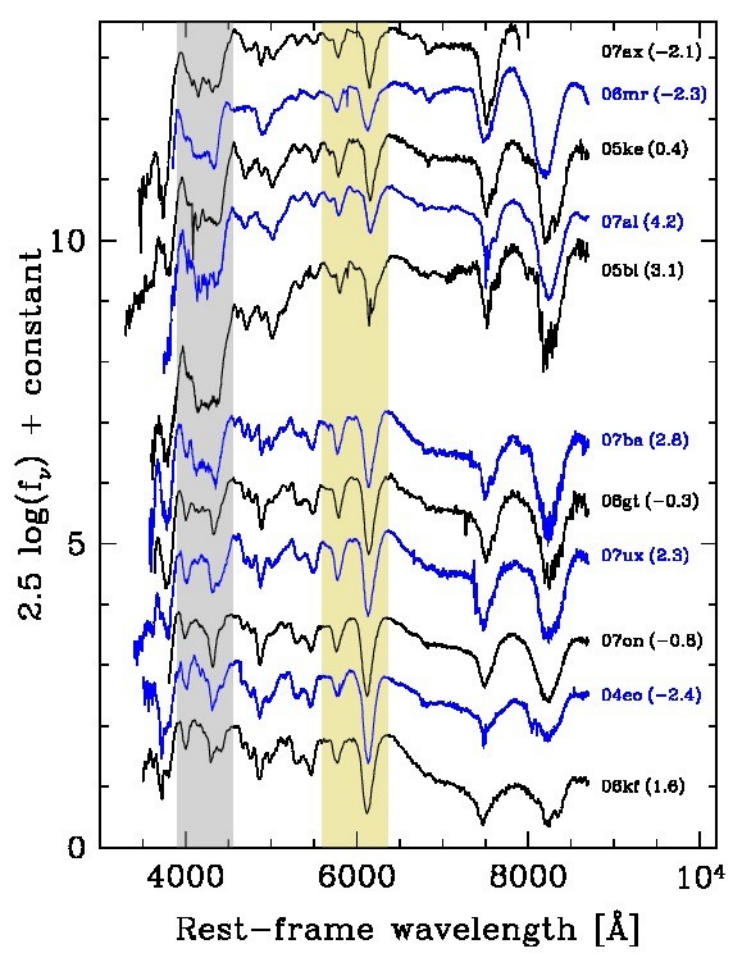
Spectral comparison

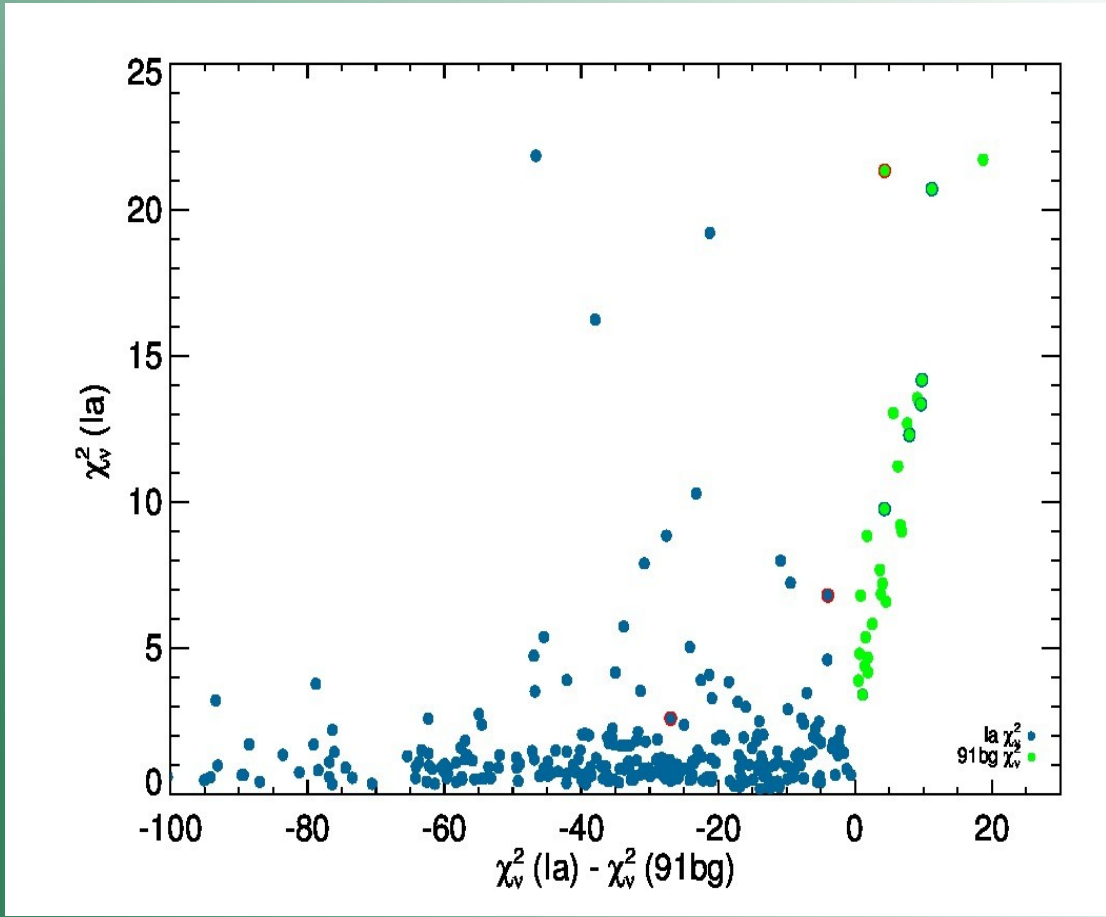


Spectral comparison



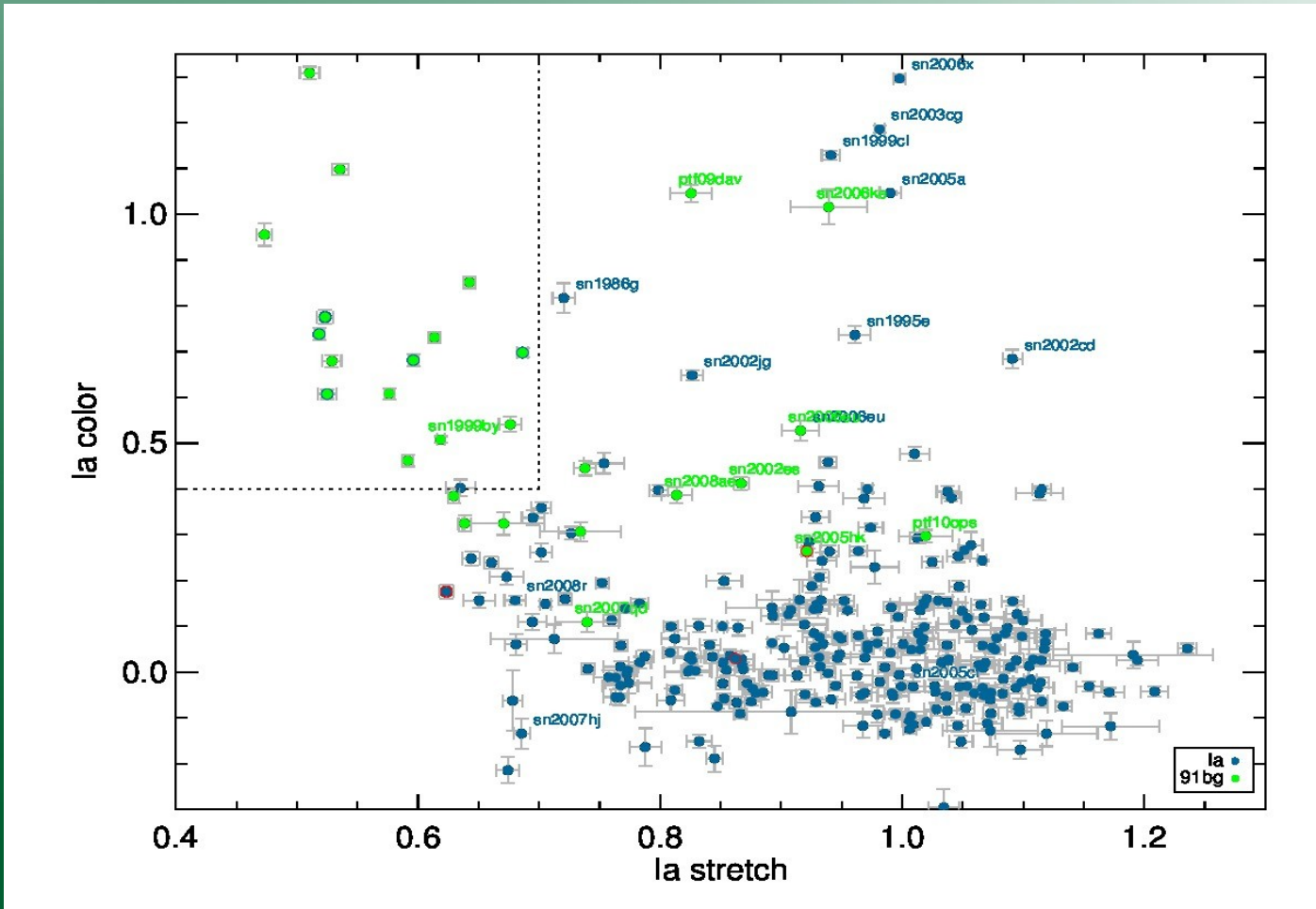
Spectra: cool and extreme cool





Folatelli et al.

Color vs stretch



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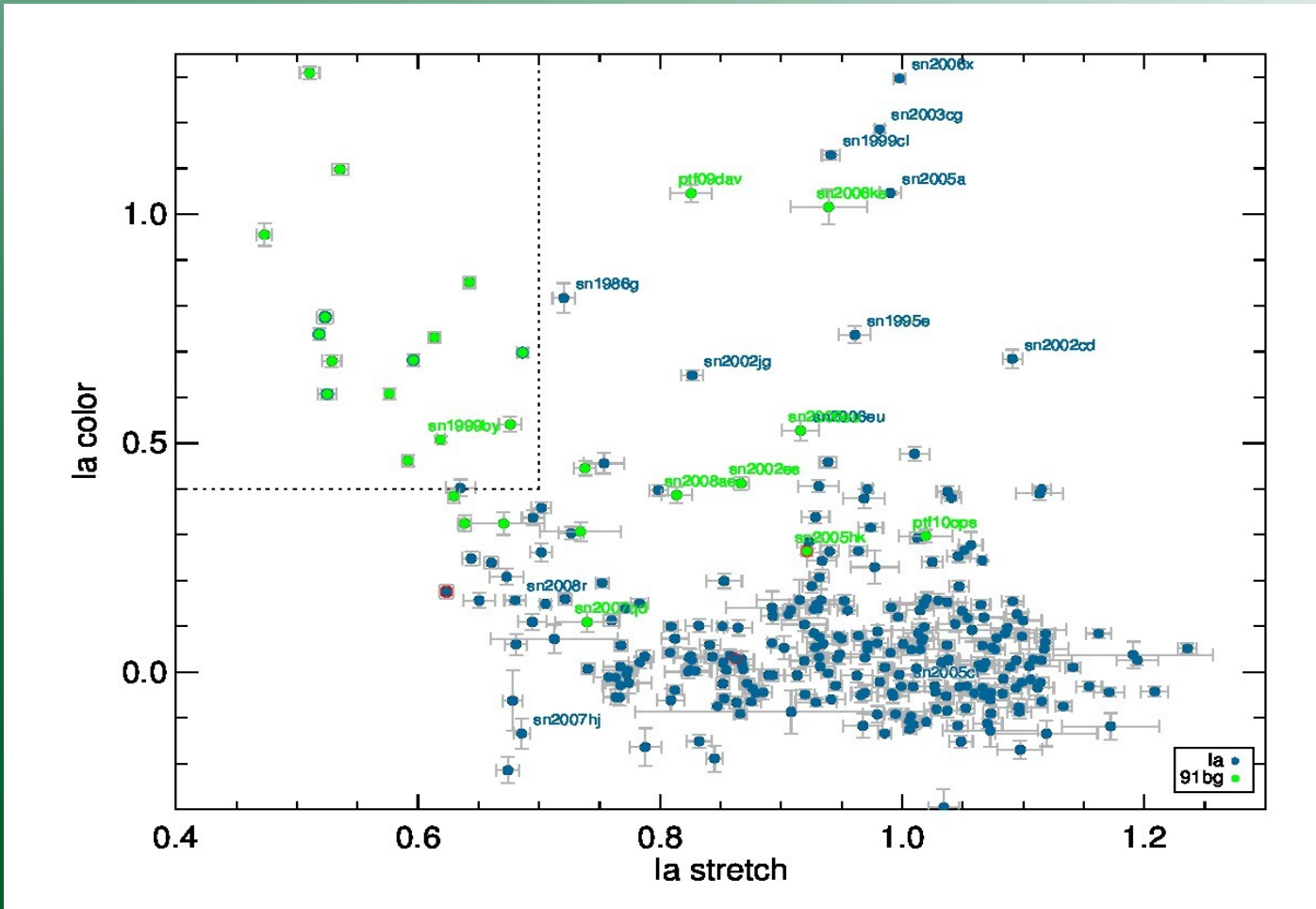

High-stretch "subluminous" SNe Ia

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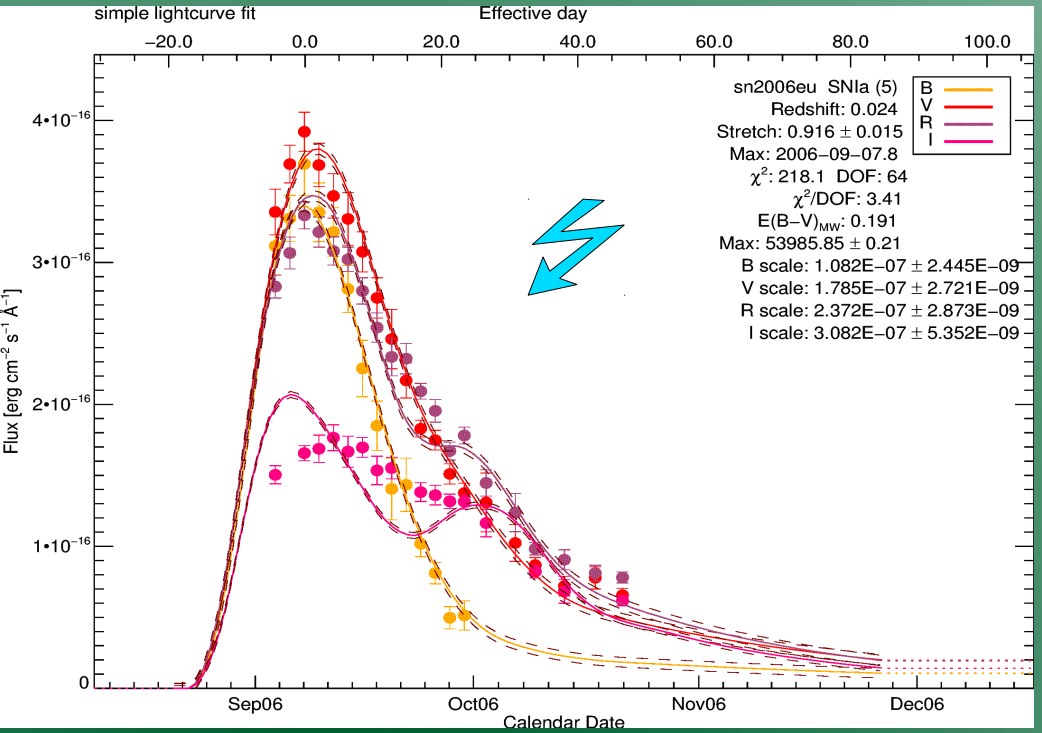
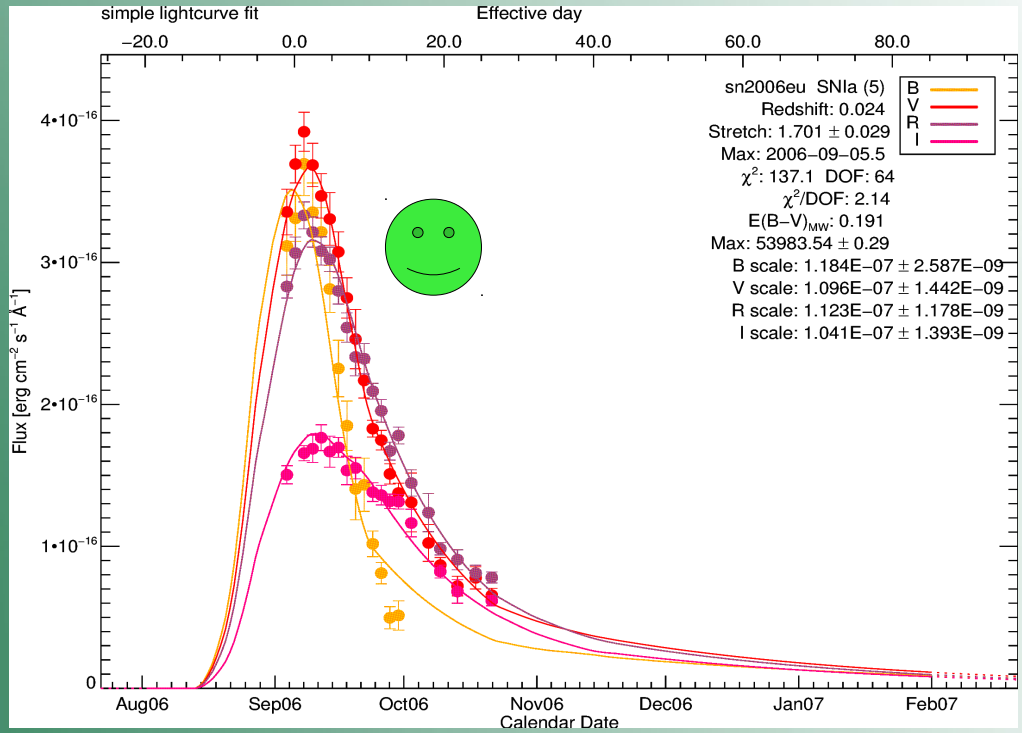
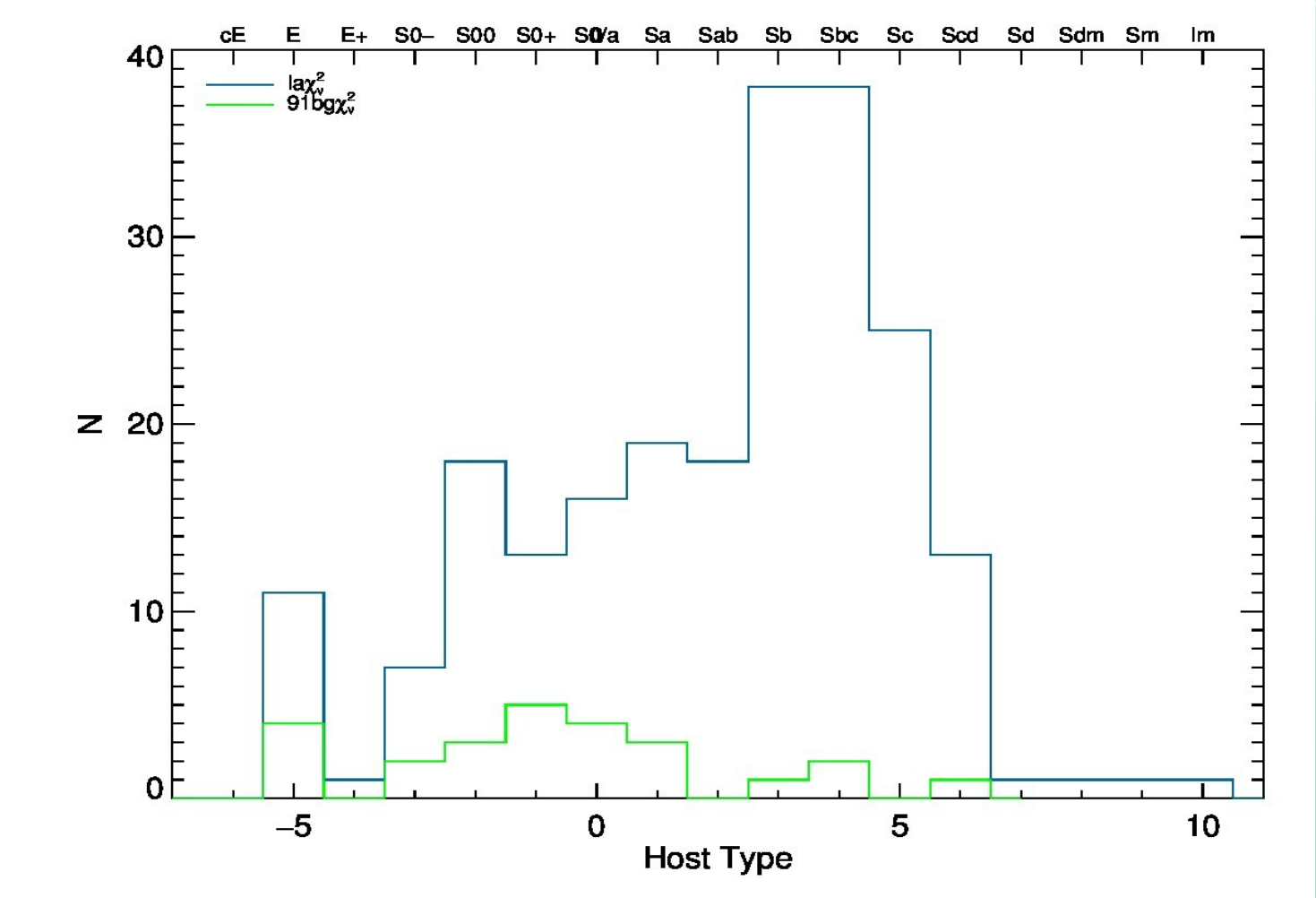


SUB IA FIT



Host properties



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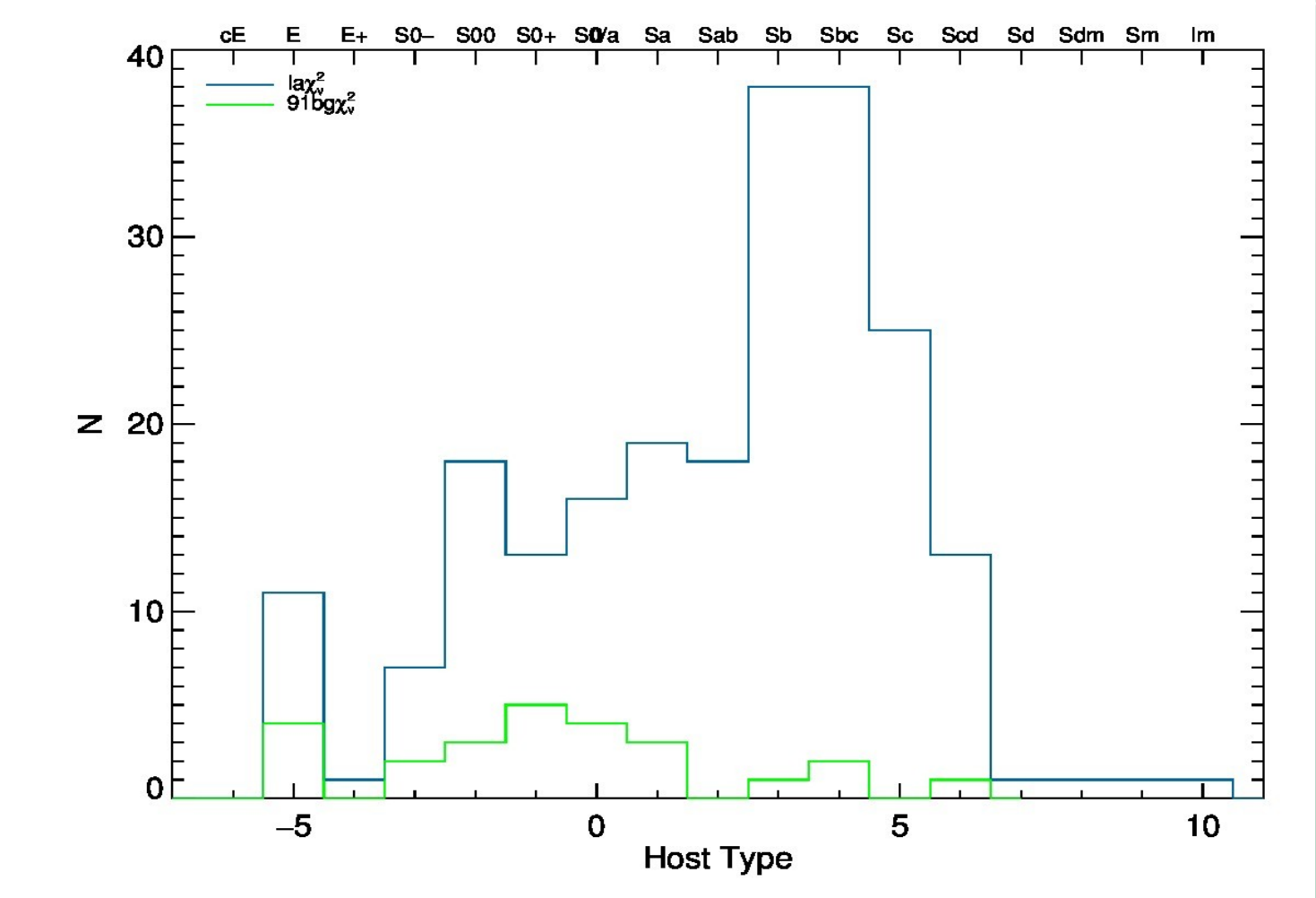

Summary & Future work

- Successful photometric identification of subluminous SNe Ia
- Possible method to identify weirdos
- Continuous photometric population?
- PCA spectral analysis: Eric Hsiao
- Reddening investigation: with F. Forster
- Ni mass estimates