Overview of the Joint Lightcurve Analysis (JLA)

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SDSS-SN Meeting @ ANL

SDSS + SNLS Joint Effort

- After years of discussion, SDSS & SNLS officially began to collaborate as of June 2010.
- Will share data and analysis tools, and write joint science paper(s).
- **Goal 1**: SDSS/SNLS calibration should be better understood than ill-defined Landolt system for legacy/nearby SNe (may toss nearby SNe Ia)
- **Goal 2**: study systematics of SALT2 training using SED models to simulate both photometric light curves and spectra. Study impact of data gaps, poor S/N, galaxy contamination in spectra, etc …
- **Goal 3**: public release of training code.

What about MLCS ?

- ESSENCE team is re-training MLCS with a larger nearby sample … it's out of our hands, but if/when a re-trained MLCS model is available we may write a separate MLCS-based cosmology paper to compare with the SALT2 analysis.

Why JLA Acronym ?
(Joint Lightcurve Analysis)

Participants of JLA

- Officially, anyone from SDSS & SNLS can participate.
- Current key players from SNLS/Paris:

  J.Guy, P.Astier, N.Regnalt, R.Pain, M.Betoule
- Current key players from SDSS:

  J.Marriner(FNAL), J.Mosher(U.Penn), R.Biswas(ANL), RK(UofC)

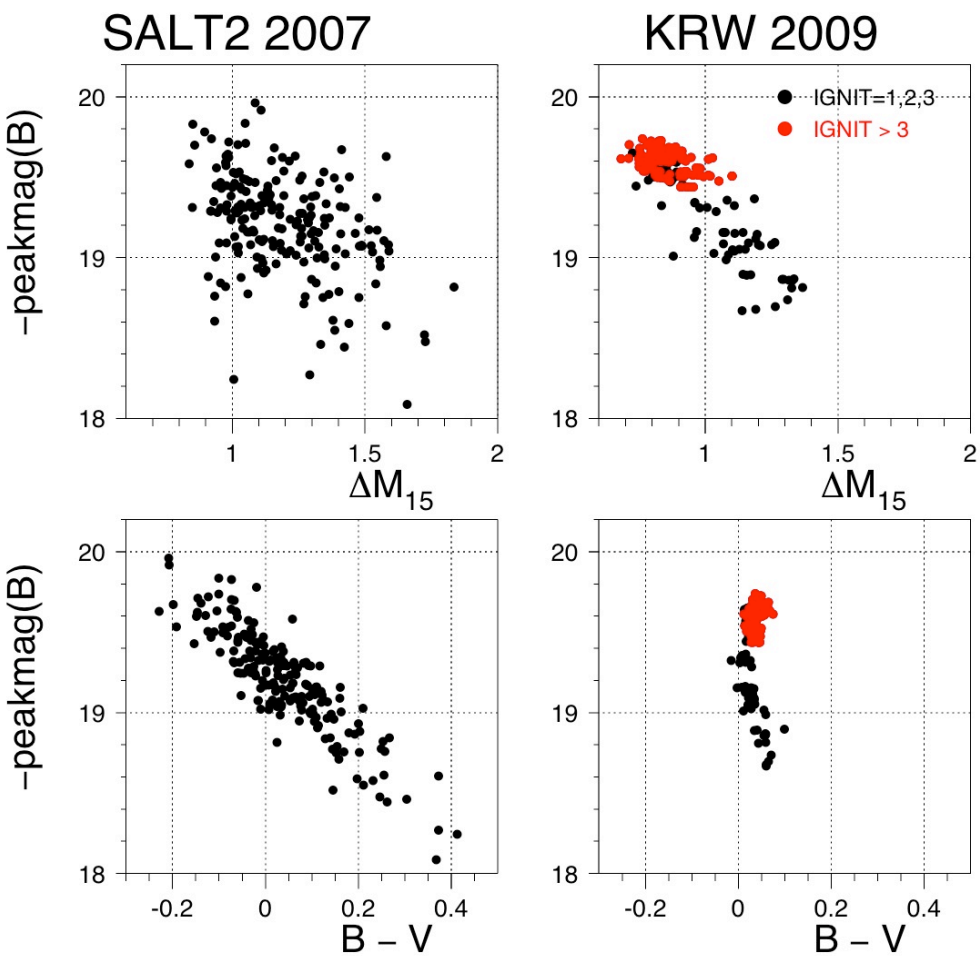
Goal 2: SED Models

- SEDs from Kasen, Ropkey, Woosley, Nature 2009 (KRW09). Depends on three parameters:
  1. detonation 2. ignition index 3. cos(angle)
- We use these SEDs only to study quality of SALT2 training … ***no overlap with Flash/SNIa effort***. Obvious defects in SEDs are fixed with fudges.

Defects in KRW09 Model

- No color variation (unphysical)
- Tmax is only 30 days past peak (can't study training on later times)
- Very poor photon statistics for UV region, for very early times, and late times
  => fudged SEDs with smoothing algorithm

KRW09 vs. SALT2



<= pick params to get reasonable Phillips relation in KRW09

<= KRW09 has no color law, so we fudge color law

Semi-Analytic SED Model: "Hsiao+Fudge"

- Since the Phillips relation in KRW09 is not well understood, we also take the Hsiao spectral surface (from data), and analytically apply stretch and color relations. This "Hsiao+Fudge" model gives us more analytical control than for KRW09.
- Also avoids KRW09 problems of excess noise in UV region and Tmax = 30 days.
- Drawback: Hsiao+Fudge may be overly simplistic, so extra fudges (i.e., scatter) may be needed.

Status of Training SED Models
(see talks by Jennifer & Rahul)

JLA Workshop at UofC
Dec 6-8, 2010

- Morning of Dec 6 will consist of overviews from SDSS, SNLS, UofC Flash, …
- All five French/SNLS members will be there.
- All SDSS members are welcome if you don't mind coming out to Chicago again in 6 weeks.