"Maxito's brief on several CSP initiatives"

...kindly presented by M. M. Phillips

"Unfortunately I'm unable to participate this lively CSP meeting as I've snuck away to Rome to re-charge between teaching quarters, and to attend a wedding! However, here are a few slides on several projects some of us are working on, and now Mark, please, take it away!"

1. Near-IR K corrections of Type Ia

- Take worlds "published" sample of NIR SNe-Ia and aim to:

1. Compute NIR K corrections
2. Estimate the systematic uncertainties of NIR K corrections

- Sample is not ideal, most spectra have no broad-band NIR photometry

→ Motivates us to color correct or *mangle* the observed (extended in lambda) spectra to match fiudical un-reddened (*i*- through K_s-band) colors of SN 2006ax

e.g. *JH*-band NIR K corrections

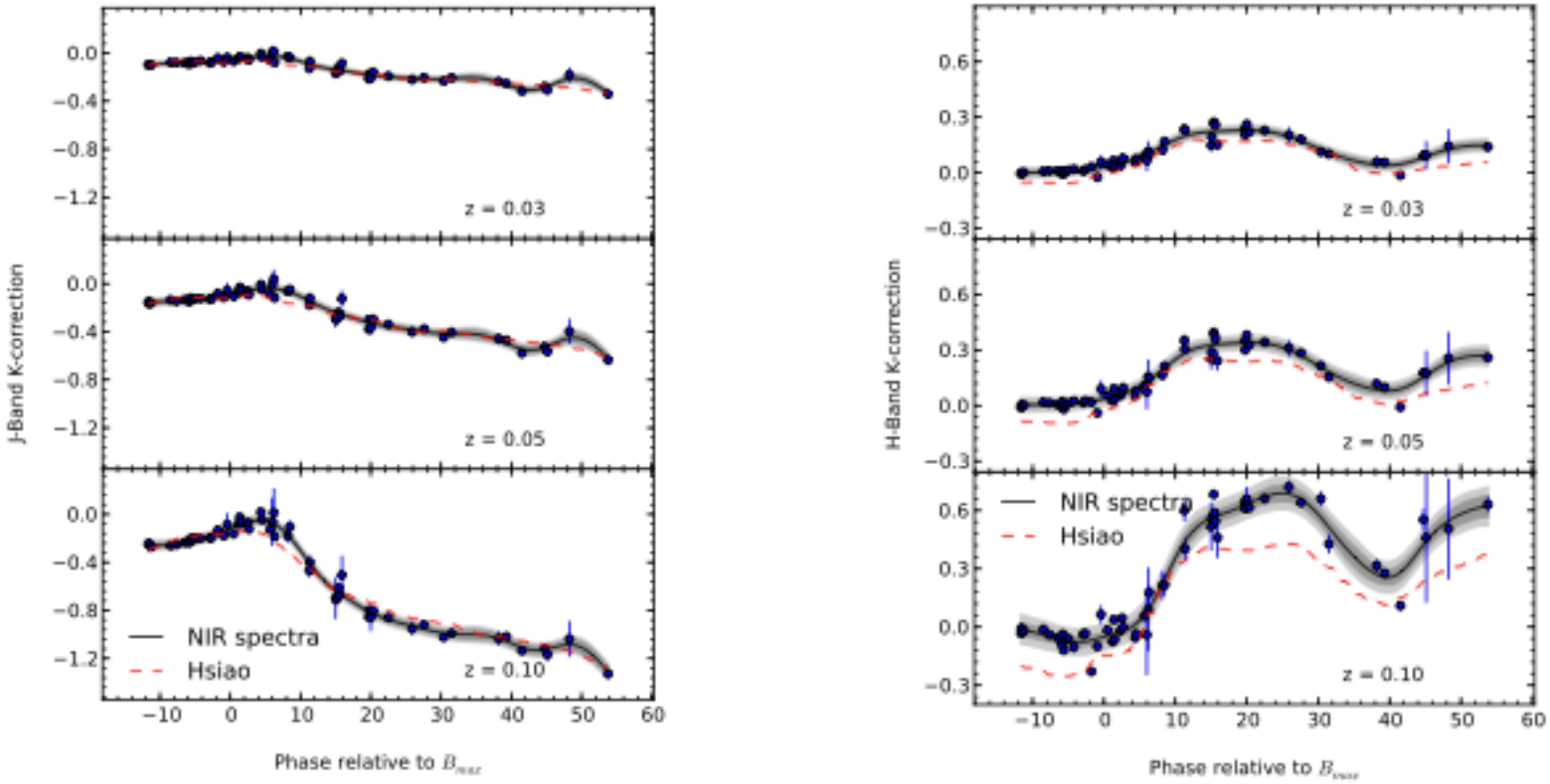
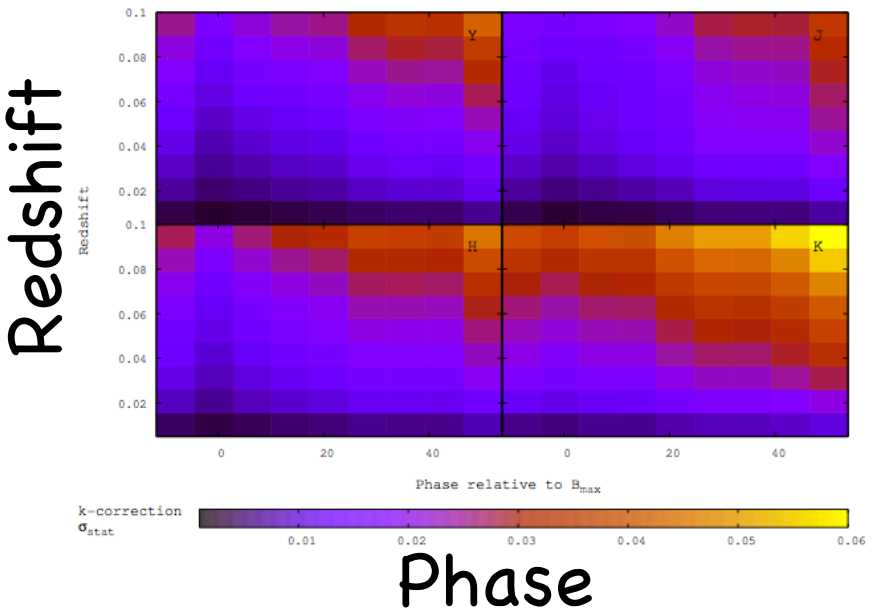


Fig. 4.— Plotted as blue points are the $YJHK_s$-band K corrections computed from 66 NIR SN Ia spectra for the red-shift values $z = 0.03$, 0.05 and 0.10. Solid black line corresponds to MCMC interpolated functions, while dark and light shaded regions correspond to σ_{stat} and the summation in quadrature of σ_{stat} and σ_{var}, respectively. Over-plotted as dashed lines is the K term derived using the spectral template of Hsiao (2009). **Current set of plotted interpolations from Chris sent to me on 26 September 2012., Also please make figure as mark requested with axis and tick labels and text in the figures bigger!**

Random (left) & "Systematic" Errors (right)



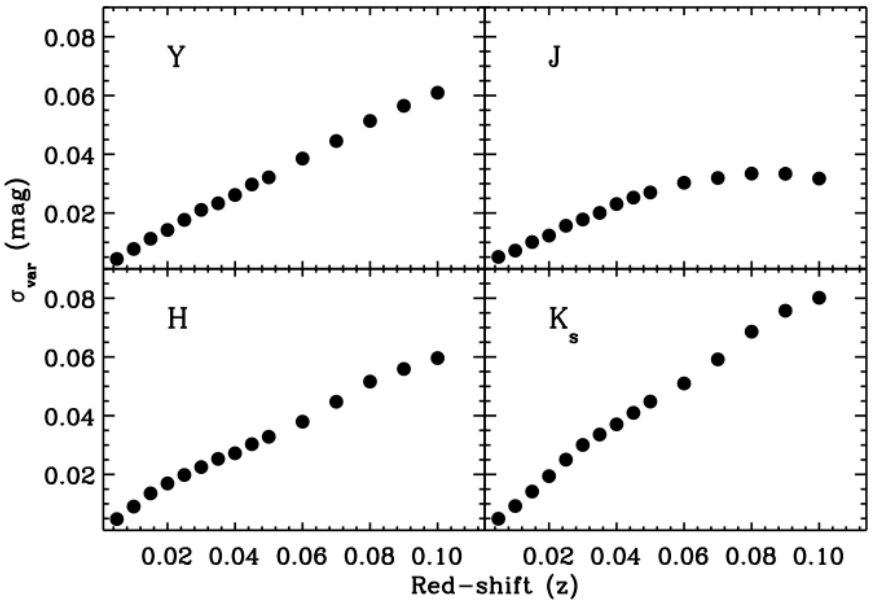


Fig. 5.— Color-coded noise maps of σ_{stat} as a function of red-shift and temporal phase i each of the NIR passbands

- *(left plot)* *Y*-band dispersion close to *J* band, thanks to anchoring to *(i-Y)* color. Dispersion in *H* band might be reduced if correlated with dm_{15}(B) (Hsiao et al. 2013)

- (right plot) Dispersion largely due to SN-to-SN differences in spectral line strengths

Status

- Draft has been circulated and commented on!
- Waiting for SN2005cf spectra to be extended to the blue by Eric
- Then to Luis for mangling and *K* correction
- Then to Chris with the addition of SN 2011fe: interpolation
- Finalize figures

- Question: to mangle observed spectra to match colors of SN 2006ax (with precise optical photometry, no NIR spectra) or to the colors of SN 2011fe (with nice NIR spectra but not precise optical photometry)?

- Remember the optical photometry is required to properly extend the spectra blue-wards of i band

Others are welcome to contribute to this epic project!

Mark has the current draft

2. Stripped-envelope core-collapse supernovae

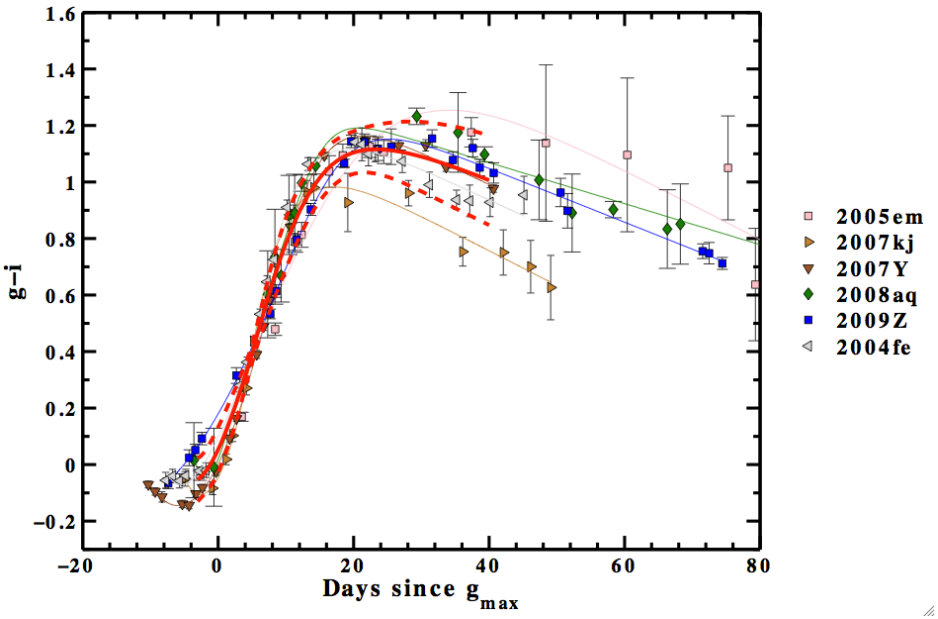
- Optical light curves of 38 Type Ib/c, IIb SNe
- Subset of 24 with NIR light curves
- Images are subtracted
- Finalizing local sequences as of last weekend with Swope Obs.
- Initial draft of photometry data paper is in hand!
- Reasonable analysis on reddening properties and defining methods to estimate $E(B-V)_{host}$
- Spectra are being analyzed with the use of a robust equivalent-width measuring code
- Initial work on construction of templates and estimated explosion parameters from UVOIR light curves

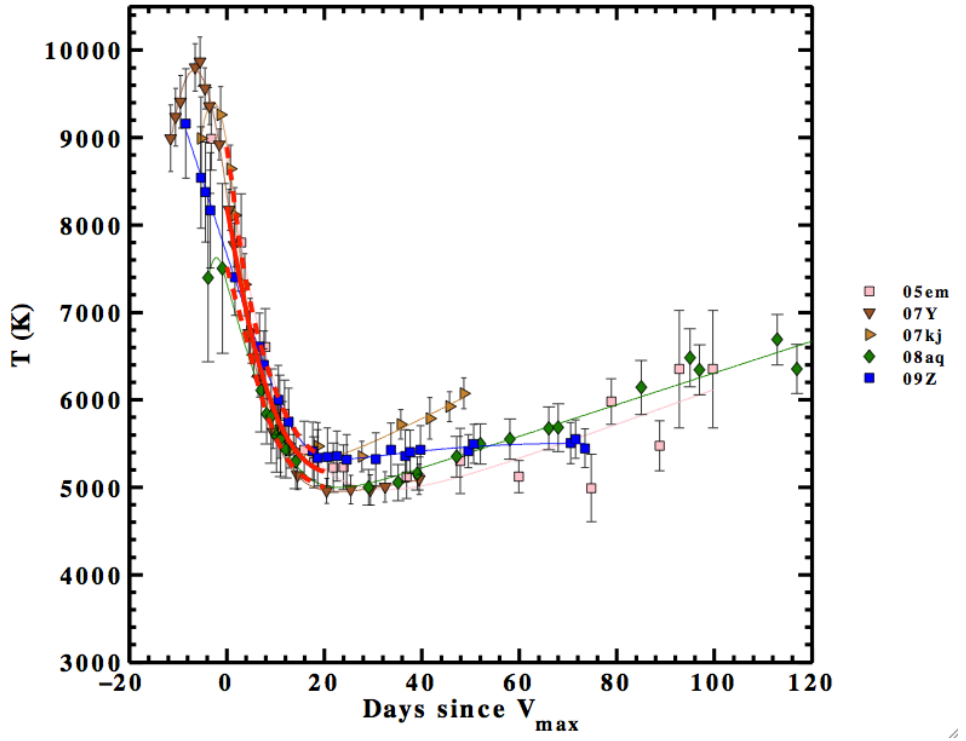
- Will the scans of the Swope NIR bandpasses from JP be completed in time for first of these papers?

My outlook is hopeful!

Developing techniques to estimate host-galaxy extinction

Intrinsic (*g–i*) colors *(left)* and black-body temperatures *(right)* of an un-reddening sample





- The un-reddened loci defined in both plots (red solid line) can be used to robustly estimate the color excess of a reddened object!

- Further analysis consists of the construction of various optical, NIR, and optical vs. NIR color loci, and placing constraints on R_V for the sub-sample with NIR photometry.

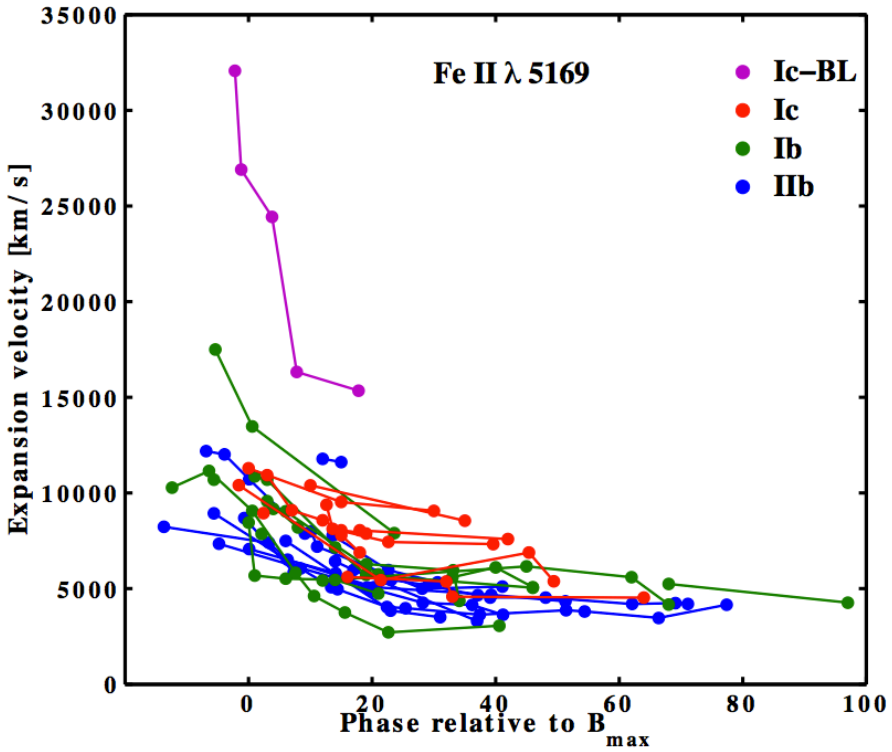
SNe-Ib/c, IIb Spectroscopy

Expansion velocity measured from the blue-shift of the Fe II λ5169 line.

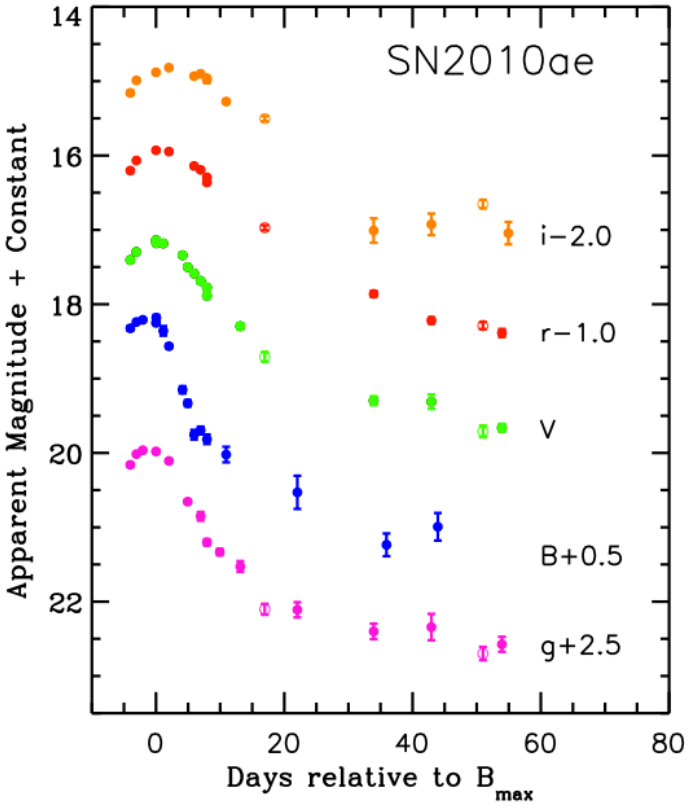
This figure gives you an idea of the size of the spectroscopic sample.

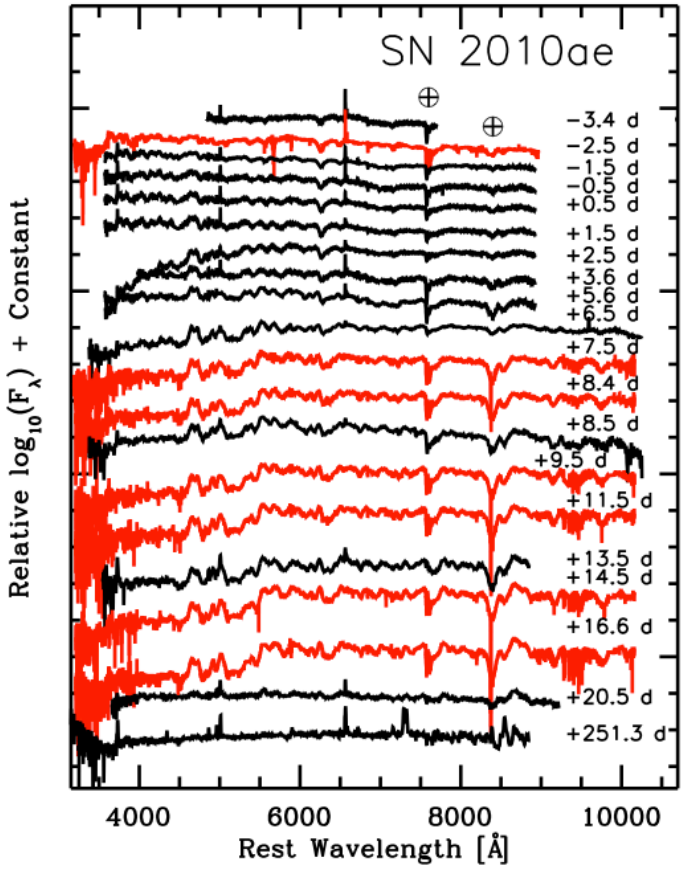
With the caveat in mind that spectral sub-typing is tricky business:

- on average SNe-Ic exhibit higher expansion velocity over SNe Ib/IIb
- working on improved classification methods
- working on EW measurements and correlations between spectral and light curve properties



3. A faint 2008ha-like supernova: 2010ae (briefly)





- *(left)* CHASE optical light curves. Waiting for CSP NIR templates.
- *(right)* Spectroscopic sequence from -3.4 to +251 days relative to maximum. Red spectra correspond to X-shooter observations, Francesco is visiting Aarhus now to reduce the NIR arm data

4. CSP-II campaign 2, and a little beyond

- Following the successful use of the Nordic Optical Telescope during Campaign 1, we requested and received 20 ToO hours of NOT time covering from now through late Feb. 2013

- We will request ~15 hours for March--April 2013

- No VLT time this campaign, but PESSTO has begun, and I am able to trigger NTT (+Sofi) for NIR spectroscopy of normal SNe-Ia

- Max received a grant funding 6 postdoc years running from 01-Jan-2013 to 31-Dec-2015. One position to be filled by the CSP tag-team combo Carlos+1 & Eric+2. Second position is open, with (brief) application deadline of 01-Dec-2012, posted on AAS as of 01-Nov-12

- Finally, I'd like to mention that Francesco is working on the CSP Type-IIn sample. Much progress have been done. I shall be editing his first draft at the beginning of November, so stay tuned!