

Department of Physics &amp; Astronomy

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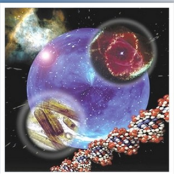
Friday, December 2, 2011

Time: 3:00 p.m. - 4:00 p.m.

BB 3.04.18

## The Usefulness of Optical and near-IR Observations of Type Ia Supernovae

Since 1993 we have known that Type Ia supernovae are standardizable candles at optical wavelengths. In a series of papers from 2004 through 2011 we have shown to what extent these objects are standard candles in the near-infrared. If we have optical and near-IR photometry of a Type Ia SN we can not only determine what kind of dust is reddening the object in its host galaxy, but the extinction corrections then have uncertainties smaller than the internal random errors of the photometry. This leads to very accurate distances to the host galaxies. Until recently the U-band photometry of these objects has been used "as is", which has led to serious problems using higher-redshift supernovae for cosmology if we include photometry obtained in the rest-frame U-band. We have been able to reconcile systematic differences up to 0.4 mag in U-band photometry taken with the CTIO 0.9-m, CTIO 1.3-m, and Las Campanas 1.0-m telescopes. These kinds of corrections should eventually allow higher-redshift surveys to eliminate a serious problem with the use of rest-frame U-band data. Minimizing the systematic errors associated with the equation of state parameter of the universe ( $w$ ) critically depends on such corrections.



### Department Contact Information

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