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# Type Ia Supernovae as Standard Candles

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Type Ia supernovae are believed to be thermonuclear explosions of carbon-oxygen white dwarf stars. Observationally they show a wide range of light curve shapes and peak luminosities at optical wavelengths. Fortunately their peak brightness correlates with the decline rate of their light curve making them “standardizable” candles with a precision of 7 to 10% in distance. At near infrared wavelengths, type Ia supernovae appear to be closer to true standard candles and also less susceptible to dust extinction. Observations between 1 and 3 microns may be the ideal way to use type Ia supernovae as accurate cosmological probes. The origin of the diversity in type Ia supernovae remains an interesting problem. The peak brightness is controlled by the mass of radioactive nickel produced in the explosion, but what determines the nickel yield? Possibilities include the heavy metal content of the progenitor star or the mass of the star that produced the white dwarf. Both possibilities are examined by studying the characteristics of the galaxies that host type Ia events.

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