Contribution ID: **220** Type: **Poster**

SN 2010kd: Photometric and Spectroscopic Analysis of a Slow-Decaying Superluminous Supernova.

Friday, 16 April 2021 08:00 (4 minutes)

This poster presents data and analysis of SN 2010kd, a low-redshift (z = 0.101) H-deficient superluminous supernova (SLSN), based on ultraviolet/optical photometry and optical spectroscopy spanning between −28 and +193 days relative to B band maximum light. The B band light curve comparison of SN 2010kd with a subset of well-studied SLSNe at comparable redshifts indicates that it is a slow-decaying but less luminous SLSN. Analytical light-curve modeling using the Minim code suggests that the bolometric light curve of SN 2010kd favors models having combined circumstellar matter interaction and heating from radioactive decay for the powering mechanism. SYNAPPS modeling of the early-phase spectra does not identify broad H or He lines, whereas the photospheric-phase spectra are dominated by O I, O II, C II, C IV and Si II, particularly, presence of both low and high-velocity components of O II and Si II lines. The nebular-phase spectra of SN 2010kd are
dominated by O I and Ca II emission lines similar to those seen in other SLSNe I. The line velocities in SN 2010kd exhibit flatter evolution curves similar to SN 2015bn but with comparatively higher values. SN 2010kd shows a higher single-zone local thermodynamic equilibrium temperature in comparison to PTF12dam and SN 2015bn, and it has an upper O I ejected mass limit of ~ 10 M. The host of SN 2010kd is a dwarf galaxy with a high star-formation rate (~ 0.18 ± 0.04 M yr−1) and extreme emission lines.

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Session Classification: Gamma-ray Bursts/SN/Instrumentation-3

Track Classification: SN