中華民國天文學會
The Astronomical Society of the Republic of China (Taiwan)

Contribution ID: **111** Type: **Oral**

Investigating UV Spectral Differences in Early-Time and Near-Peak Type Ia Supernovae

Friday, May 16, 2025 5:15 PM (15 minutes)

We investigate the ultraviolet (UV) spectral properties of Type Ia supernovae (SNe Ia) at early times and near peak brightness using observations from the Swift UVOT grism. Our goal is to identify potential differences in UV features between these two phases. We examine how UV flux ratios correlate with key parameters such as the supernova decline rate, host-galaxy stellar mass, metallicity, star formation rate, specific star formation rate, and stellar age. To this end, we construct mean spectra for early-time SNe Ia, grouped by these parameters, and compare them with those of the near-peak sample. We also compare the UV properties of SNe Ia with high ejecta velocities to those with lower velocities. Additionally, we derive host-galaxy properties local to the SNe positions to assess whether UV spectral features are influenced by the local environment. Finally, we explore whether early-phase UV properties show any non-zero Hubble residuals. This comprehensive analysis aims to provide new insights into the explosion physics and progenitor systems of SNe Ia.

Section

Galaxy/Extragalactic

Primary authors: BHATTACHARJEE, Snehasish (National Central University); Prof. PAN, Yen-Chen (National Central University)

Presenter: BHATTACHARJEE, Snehasish (National Central University)

Session Classification: High-energy astrophysics