

A Photometric Approach to Transient Classification: Insights from DESI and Sky Survey Data

With the rapid development of sky survey projects and observational technology, over 20,000 transient celestial objects have been discovered annually in recent years. However, due to limited telescope time and observational resources, only about 10% of these transients have been classified through spectroscopic analysis, leaving the physical nature of most objects is unknown. Recently, the Dark Energy Spectroscopic Instrument (DESI) has released extensive spectral data for numerous galaxies, offering valuable resources and opportunities for further analysis. This enables us to perform cross-matching between unclassified transient objects and DESI data based on celestial coordinates, facilitating the identification of potential host galaxies. By cross-matching DESI spectroscopic redshift data with images from sky survey projects, we calculate the absolute magnitudes of transient objects using the redshift of their host galaxies and their observed peak brightness, thereby achieving preliminary photometric classification. Furthermore, we conduct in-depth analysis of transient objects with extreme luminosities, including exceptionally bright ($M < -19.5$) and faint ($M > -14$) cases. This study explores the potential origins and physical implications of these unusual transients, laying important groundwork for future research.

Section

Stars/Star Clusters

Primary author: LEE, Yu-Hsing (National Central University)

Co-author: Prof. CHEN, Ting-Wan (National Central University)

Presenter: LEE, Yu-Hsing (National Central University)

Session Classification: Poster-Stars