

Transients in Middle Earth



Contribution ID: 45

Type: **not specified**

SynDiff

Monday, 9 February 2026 17:00 (20 minutes)

Over the past seven years, TESS has provided an unprecedented high-cadence view of the transient universe, yet its scientific potential is currently limited by significant correlated noise and reduction artifacts. These challenges, specifically complex time-varying backgrounds, spacecraft pointing drift, and pixel sensitivity variations, frequently hide the subtle light curve signatures essential for precision astrophysics. In this talk, I will present SynDiff, a novel approach that overcomes these barriers by leveraging deep, high-resolution ground-based data from surveys like Pan-STARRS to generate a synthetic template of the underlying astronomical scene. I will detail our methodology for forward-modeling TESS observations to isolate transient flux from contaminants. Finally, I will demonstrate how this allows us to hunt for early-time flux excess in Type Ia supernovae, providing a smoking gun signature to distinguish between different progenitor channels.

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Session Classification: Space telescopes