

# DOCTORAL DEFENSE

## Building a Better Candle: The Calibration and Classification of Type Ia Supernovae in the Upcoming Legacy Survey of Space and Time

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*Abstract:* Estimating distances on scales beyond our galaxy is fundamental to understanding the evolution of our Universe. Among the various physical mechanisms used to measure intergalactic distances, the application of exploding stars known as Supernovae (SNe) has grown significantly over the past few decades. Observational study of Type Ia Supernovae (SNe Ia) – a subgroup of the SN population – has shown that this subgroup is incredibly uniform in peak luminosity. Coupled with the fact that they are also extremely bright, this allows SNe Ia to be used as well-calibrated distance indicators known as standard candles.

The current generation of large-scale astronomical surveys have used SNe Ia to measure the Universe with unprecedented precision. Upcoming surveys like the Vera C. Rubin Observatory's Legacy Survey of Space and Time (LSST) plan to take this even further. Achieving the precision level promised by LSST requires a significant reduction in the systematic and statistical uncertainties commonly found in SN studies. In this talk, I will discuss work I have undertaken to address specific challenges faced by the LSST SN science effort. In particular, I will present a technique for identifying SNe Ia that exhibit non-standard photometric behavior, such as lower luminosities and faster evolution of brightness over time. I will also discuss the simulation of an LSST-like dataset used to quantify the impact of atmospheric effects on LSST observed SNe.

**Tuesday**  
**April 27, 2021**  
**2:00 PM**

**Zoom ID: [952 0758 0210](#)**

**Non-department members:**

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