SAN DIEGO STATE UNIVERSITY DEPARTMENT OF ASTRONOMY MASTER'S THESIS TALK

Speaker: Harish Khandrika

Topic: Optical and Near-Infrared Photometric Observations of Supernovae Using CCD2005 and the NIRIM Infrared Imager

Time: 1:00 PM, Monday, June 20, 2016

Place: Room 215, Physics-Astronomy Building (PA-215)

Abstract:

In this study, I present optical (B, V, R, I) and near-infrared (NIR; J, H, K) photometric observations of three supernovae obtained at the Mount Laguna Observatory (MLO) 1-meter telescope as part of the MOunt LAguna SUpernova Survey (MOLASUS), primarily in an effort to characterize the NIRIM infrared imager, which had not previously been used to conduct standardized photometric measurements. I calibrated and configured NIRIM for use in such photometric observations by confirming its linear response, and computing its basic characteristics (e.g., read noise and gain). I established the optimal procedure for observing and reducing NIRIM data, and created a pipeline for processing and analyzing NIRIM images. With the established procedure, I used NIRIM (as well as MLO's optical camera, CCD2005) to obtain multi-epoch photometry of supernova (SN) 2013ej (a Type II-Plateau), SN 2013dy (a Type Ia), and SN 2014J (a Type Ia), over a period of nine months (July 2013 - March 2014). Through the direct comparison of the NIRIM results with published NIR values of SN 2013ej and SN 2014J (two very well observed SNe, for which multiple sources of J- and H-band data exist in the literature), I show that NIRIM is indeed capable of producing standardized photometric measurements, provided that sufficient care is taken in the acquisition and reduction of the data; the BVRI data are also shown to be consistent with published results. This thesis thus establishes NIRIM as a viable instrument for obtaining accurate standardized photometric data. Finally, I provide a brief analysis of the three SNe's photometric properties.