Challenge: Supernovae Iax

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ABSTRACT

We present an analysis of Supernovae (SNe) 2008ge, 2008ha, 2010ae, 2010el. These SNe were observed using the Hubble Space Telescope (HST) in the optical wavebands. These SNe are catagorized as Type Iax, a distinct category from Type Ia or Type II. Iax are notible for their low spectra luminosity and low ejecta velocities. The stellar populations around these four SNe were analyzed to understand the ages of the SNe. There is a correlation between the ages of the four separate SNe. The details of the analysis include an examination of wavebands ; adjusting the spectra for host and Milky Way (MW) reddening; and filtering out sources with respect to their crowding, sharpness, and roundness features. Further study needs to be done to have conclusive results.

Key words: supernovae: general - supernovae: individual (SN 2008ge, SN 2008ha, SN 2010ae, SN 2010el)

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1. Introduction

Thermonuclear explosions, Type Ia Supernovae (SNe Ia), have been studied more in the last decade due to the increase in technology and an interest in the accelerating universe. Type Ia are used to measure the rate of expansion in the universe (Perlmutter et al. 1999) because of their near uniform light curves. However, not all thermonuclear explosions share this behaviour. Continued study of thermonuclear explosions reveal a range of behaviours and spectral features.

The type of SNe that will be discussed in this paper is SNe Type Iax, these are a distinct catagory from Type Ia (Thermonuclear explosions) and Type II (Core-collapse SNe). Iax possesses a less luminous light curve and a slower decline rate (SOURCE). They have a lower ejecta velocity and do not show hydrogen and helium in their spectra unless the elements were brought in by outside factors, such as circumstellar disks or intermediate mass elements (SOURCE). Iax do not have an observable second maxima in the near-infared (NIR), (e.g., Li et al. 2003). The explosion mechanics of Iax are still unknown. They closest model predicts accretion from a Helium star onto a Carbon-Oxygen White Dwarf (C/O WD) (SOURCE). The unique features of Iax indicate that they are not a subset of Ia, but should instead be considered their own class.

Earlier literature called Iax, 'SN2002cx-like'. SN2002cx was the first SN to be heavily studied because of it's peculiar characteristics. These distinctions from Ia and the similarities between newly observed SNe created the class Iax. Four SNe from this class were studied in this analysis, SN2008ge, SN2008ha, SN2010ae, and SN2010el. The focuse was on contraining the age limit of the surrounding stellar populations of these four SNe.

The stellar population around SN2008ha (08ha) was modeled prior to this analysis. 08ha (why was this modeled more? Lets assume you know). The constraints from 08ha were applied to 08ge, 10ae, and 10el.

In this paper, we will discuss our findings of Iax stellar populations In section 2, we will discuss the Spectroscopy and Photometry of these SNe and compare it with earlier results. We will discuss the methods of our analysis in section 3. In section 4, we will discuss our contraints and results. The summary of this project is in section 5. The World Coordinate System (WCS) is used throughout this

analysis.

2. Class Members

The current list of SNe Type Iax contain 25 SNe. Of that list, 4 were chosen to study in depth.

2.1. SN 2008ge

2.2. SN 2008ha

2.3. SN 2010ae

2.4. SN 2010el

3. Spectroscopy & Photometry

This analysis used Hubble Space Telescope (HST) images in the F435W, F555W, F625W, and F814W wavebands. HST Info, camera lens size and date and time it observed each object. This data was collected [DATE] using [type of collection method, ccd stuff].
From these images we were able to generate a catalog of sources using Dolphot

4. Methods

METHODOLOGY TEXT

5. Discussion

6. Results

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