



PHYSICS AND ASTRONOMY SEMINAR

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“Type Ia Supernovae: Explosions and Progenitors”

Abstract

Type Ia supernovae are known as the precise distance indicators that allowed the remarkable discovery of the accelerated expansion of the universe. Despite this astounding feat, there still remain large uncertainties in many of the key issues surrounding these extremely energetic events.

These uncertainties, while not being horribly detrimental to their use as distance indicators, hamper the understanding of the far reaching consequences these cosmic factories of heavy elements have on the chemical evolution of the Universe.

Type Ia Supernovae can be divided into three distinct phases. The pre-supernova evolution, the explosion itself and the expansion phase, which results in spectra and light-curves.

In this talk I will first presents our findings on the progenitor question (pre-supernova phase):

Are these objects the result of the merger of two white dwarves or one white dwarf accreting from a non-degenerate companion. In the second case, the companion will most likely survive the event and should be seen, post-explosion, in remnants. We have scrutinized two ancient remnants for such a companion star, namely those of SN1572 and SN1006. I will show the findings in the context of other research in that area.

In a second part of the the talk, I will outline how to extract information like energies and yields from optical spectra of Type Ia Supernovae fitting them with synthetic spectra. In particular, my work pertains to the automation of this complex fitting processes. I will discuss the merits of the automated fitting many Type Ia supernovae and will outline our progress using artificial intelligence algorithms.

Friday, February 17, 2012

9:30 a.m.

Elliott Building

Room 503 (Chartroom)