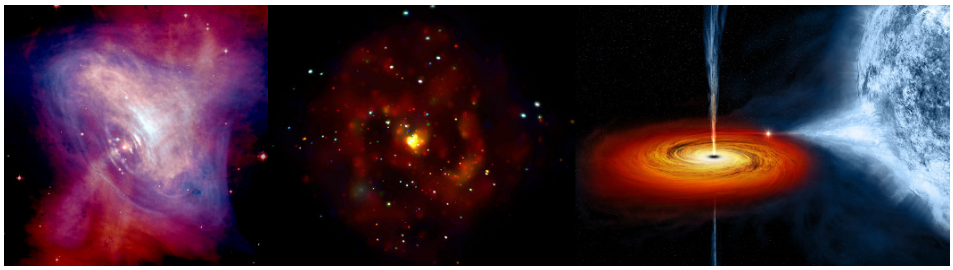

Contribution ID: **61** Type: **not specified**

Probing the homogeneity / diversity in Type Ia supernova explosions

Tuesday, April 4, 2023 5:10 PM (10 minutes)

Type Ia supernova (SN Ia) arises from the thermonuclear explosion of at least one carbon-oxygen white dwarf in a binary system. The most favored explosion model is the delayed detonation in a Chandrasekhar mas WD (single degenerate scenario). This explosion produces a stratification in the abundance structure of the elements present in the ejecta. The heavier elements, like Ni-56 and Fe, are present in the innermost layers, followed by the intermediate mass elements like Si, S, and Mg in the inner layers and unburned C and O in the lower-density outermost layers. We study five SNe for which the velocity of C is lesser than Si and is blue in the near-UV than a sample of normal SNe Ia. This can mean that the explosion mechanism is such that unburned materials are present in the inner layers. We perform 'Monte Carlo radiative transfer' simulations in one dimension by varying the density profiles and using the abundances from two competing explosion mechanisms - a violent merger of two CO WD's (double degenerate scenario) and delayed detonation in a Chandrasekhar mas WD. We consider various C abundance structures to simulate the C absorption feature in the pre-maximum spectra. We also simulated the light curves to find that -
All these five SNe Ia cannot be explained by a single explosion mechanism, even though they have some similarities in their observed properties. Hence, multiple explosion channels are proposed.

Presentation Type

Oral

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