The Beginnings and Ends of Double White Dwarfs

Contribution ID: **11** Type: **Talk**

The double-degenerate model for the progenitors of SNe Ia

Type Ia supervovae (SNe Ia) have been successfully employed as standard cosmological distance indicators. It has been found that the Universe is expanding at an increasing rate through the observation of SNe Ia, which reveals the existence of dark energy. However, the progenitors of SNe Ia are still unclear, which may affect the accuracy of the mearsured distance. Recently, both observational and some theoritical studies slightly favor the double-degenerate model, in which the merging of double Carbon-Oxygen white dwarfs (CO WDs) would produce SNe Ia as their total mass is larger than the Chandrasekhar limit. In this talk, I will introduce the proposed CO WD+He subgiant channel for producing SNe Ia based on the double degenerate model. Previous studies on the double-degenerate model still have deficit with the observed SNe Ia with ages less than 1 Gyr and longer than 8 Gyr. After considering the WD+He subgiant channel, we found that the distributions of the predicted SN Ia ages is comparable with the observed results. I will also introduce our recent studies on the formation of SNe Ia from the violent mergers of double CO WD and the merging of CO WD+hybrid HeCO WD systems.

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Session Classification: Supernovae & their Aftermath