

Towards an understanding of Type Ia supernovae from a synthesis of theory and observations

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Type Ia supernovae play an important role in various fields of modern astrophysics. They are, for example, crucial for the chemical enrichment of the Universe. Moreover, an empirical relation between their light-curve width and peak brightness makes them standardisable candles that can be used to measure the expansion history of the Universe. However, we still do not have a detailed understanding of the nature of these luminous objects since their progenitor systems so far eluded a direct detection. In the past two decades an increasing amount of post-explosion observational data has shown that Type Ia supernovae are less homogeneous than previously thought indicating that different progenitor systems and explosion mechanisms might be involved. In this talk, I will summarize the observational constraints and show how recent progress in theoretical modelling of Type Ia supernovae can help understand the observed diversity.