



The Beginnings and Ends of Double White Dwarfs

Contribution ID: 20

Type: Talk

Collisions of two white dwarfs and the associated nucleosynthesis

Thursday, 4 July 2019 14:40 (20 minutes)

Traditionally it has been assumed that the collision of two white dwarfs was a low probability event confined to the surroundings of the Galactic centre or to the core of globular clusters. Depending on the nature of the two stars (mass and chemical composition) and on the parameters of the collision (relative velocity and impact parameter) the outcome of the encounter can go from a simple tidal stripping of the white dwarf matter, to a true thermonuclear explosion that can be assimilated to some Type Ia supernova subtype. In general, the ejected mass will consist on completely and partially burned material and pristine mass of the white dwarf. The frequency at which they can occur is still a matter of debate and, consequently, their contribution to the galactic chemical evolution uncertain. However, the recent realization that hierarchical triple and quadruple systems can provide an adequate additional scenario for such encounters, shows that these events can occur anywhere in the Galaxy and, in particular, in the solar neighbourhood.

The pristine material, that globally has the chemical composition that results from the hydrostatic H and He-burning, can have local peculiar isotopic compositions caused by the sedimentation processes occurring inside the white dwarfs during their cooling. If these peculiarities are retained via the formation of dust grains and their inclusion in protostellar nebulae, they could account for the existence of some meteoritic anomalies similar to those found in the Solar System.

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Session Classification: Supernovae & their Aftermath