

The Laminar Flame Speed in Type Ia Supernovae



Image credit:

High-Z Supernova Search Team, HST, NASA

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Type Ia supernovae result from the thermonuclear incineration of a white dwarf star. They are currently the premier standard candle for measuring the geometry of the universe and for probing the properties of the "dark energy" that is making the universe accelerate at an accelerating rate. Despite their importance, many of the details of the explosion remain poorly understood. One unanswered question is how the composition of the white dwarf affects the explosion.

Michigan State University graduate student David Chamulak has demonstrated that the enrichment of the white dwarf with neon-22 (formed during the fusion of helium in the progenitor star) **speeds up** the flame in the early stages of the explosion. This finding means that distant supernovae, which exploded long ago when the universe was poorer in heavy elements, are somewhat different than nearby supernovae. It remains to be seen whether this translates into any systematic errors in using type Ia supernovae as "standard candles."

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