

DETECTION OF CIRCUMSTELLAR MATERIAL AND ROTATION IN A RUNAWAY SNIa DONOR

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A promising progenitor scenario for Type Ia supernovae (SNIa) is the thermonuclear detonation of a white dwarf in a close binary system with another white dwarf. After the primary star explodes, the surviving donor can be spontaneously released as a hypervelocity runaway. One such runaway donor candidate is LP 398-9, whose orbital trajectory traces back $\approx 10^5$ years to a known supernova remnant. I will discuss our recent discovery of carbon-rich circumstellar material around LP 398-9. The circumstellar material is most plausibly composed of inflated layers from the star itself, mechanically and radioactively heated by the past companion's supernova. I will also present our detection of a 15.4 hr periodic signal in the UV and optical light curves of LP 398-9, which we interpret as surface rotation. The rotation rate is consistent with theoretical predictions from this supernova mechanism, and the brightness variations could originate from surface inhomogeneity deposited by the supernova itself. Our observations strengthen the case for this double-degenerate SNIa progenitor channel.