

Abstract Submitted
for the CUWIP22 Meeting of
The American Physical Society

Estimating the Age and Ambient Medium Density of SNR 0509-67.5 Using Self-Similarity ZOE ROSENBERG, PRASIDDHA ARUNACHALAM, JOHN P. HUGHES, Rutgers University — Self-similarity is a methodology which describes exactly or approximately similar objects. It naturally occurs both on Earth and in outer space, and has wide applications in astrophysics. Self-similarity is an important aspect being used to study Type Ia supernova remnants (SNRs), since we can assume they are approximately self-similar as they expand into the ambient medium as a function of time within certain stages of their evolution. SNRs are self-similar because their internal structure remains approximately the same over time. When a remnant is self-similar, it is possible to use similarity solutions to determine quantities that would be much more difficult to determine otherwise. Using similarity solutions from Table 7 of the Truelove and McKee study in 1999, along with specific values of the mass of the explosion and the explosion energy, we estimate values of the age and ambient medium density for 0509-67.5, a Type Ia SNR residing in the Large Magellanic Cloud.

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Date submitted: 11 Jan 2022

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