Dust Production in Supernovae: Outstanding Questions and Recent Insights from JWST

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Abstract

The discovery of massive dust reservoirs in high-redshift galaxies suggests that dust had to form on short timescales and that core-collapse supernova (SN) explosions may be the primary contributors to dust enrichment in the early universe. Observations of SN 1987A and other supernova remnants (SNRs) over the past two decades have established that SNe can produce large quantities of dust, yet fundamental questions remain about how and when the dust forms, and what fraction will ultimately survive to be injected into the interstellar medium (ISM). In this talk, I will summarize the major outstanding questions surrounding dust production in SNe and the role these explosions play in enriching the ISM. I will highlight recent insights from JWST observations that have revealed dust formation in extragalactic SNe in real time and resolved sites of dust formation in SNRs in unprecedented detail.

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