

Comparing lightcurves of SN2014J to SN1987A between cooling phase and Nickel-56 peak

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1 Abstract

When a supernova explodes, the matter of the star is ripped apart with such force that even neutrons are ripped from protons. As the expanding cloud cools, the matter forms into ^{56}Ni , a relatively stable atom. ^{56}Ni decays over time into ^{56}Co , then ^{56}Fe . Each of step of this decay process releases gamma rays, which deposit energy into the surrounding gas, "propping up" the supernova's luminosity.

Preceding the peak of ^{56}Ni and thus luminosity in the supernova and after the drop in luminosity due to cooling, Type Ia supernovae like SN2014J and Type II-P supernovae like 1987A differ significantly. Here we compare example lightcurves from each category and discuss implications for how the supernovae explode and how we decide taxonomy.