

70 YEARS OF CREATING TOMORROW



Los Alamos
NATIONAL LABORATORY

The Effect of Circumstellar Material on Simulations of SN Light Curves

Wesley Even



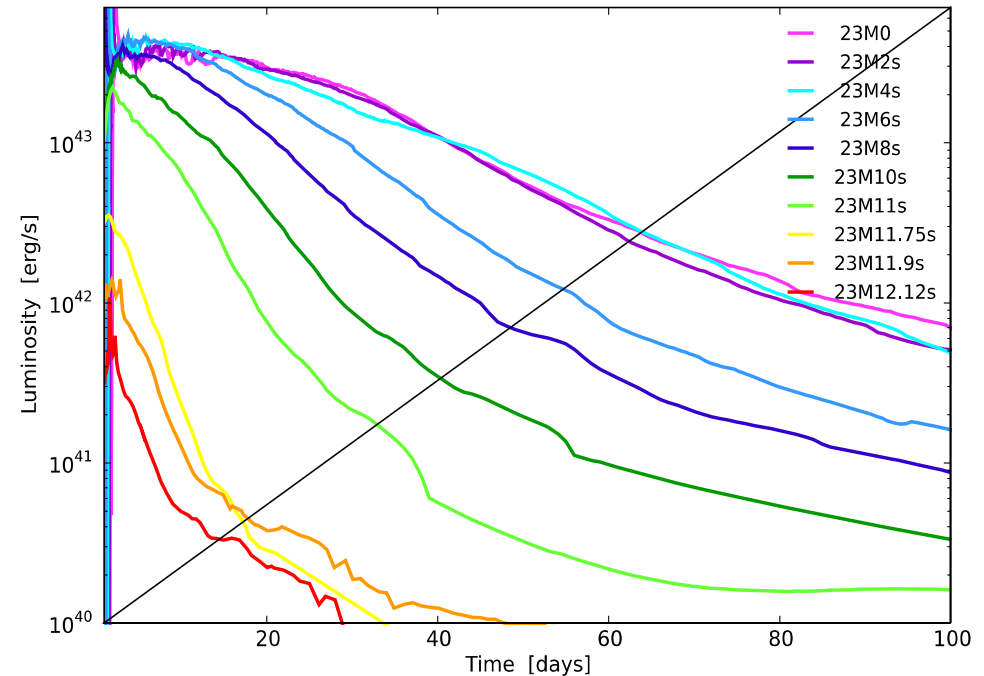
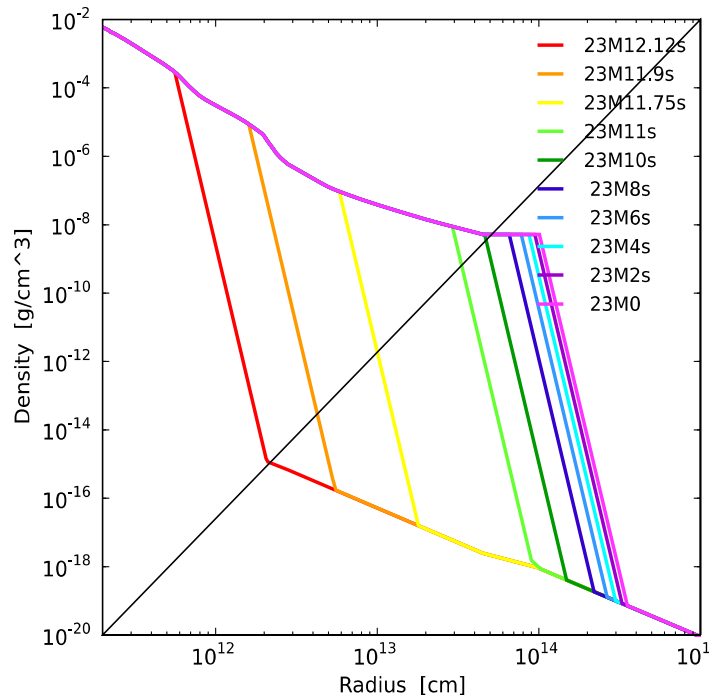
Los Alamos Supernova Light Curve Project

- An online database of simulated supernova
 - Large Variety of stellar progenitor models
 - Detailed sensitivity studies across a range of parameters
- Early version available now
 - Limited models and analysis tools
 - <https://supernova.lanl.gov>

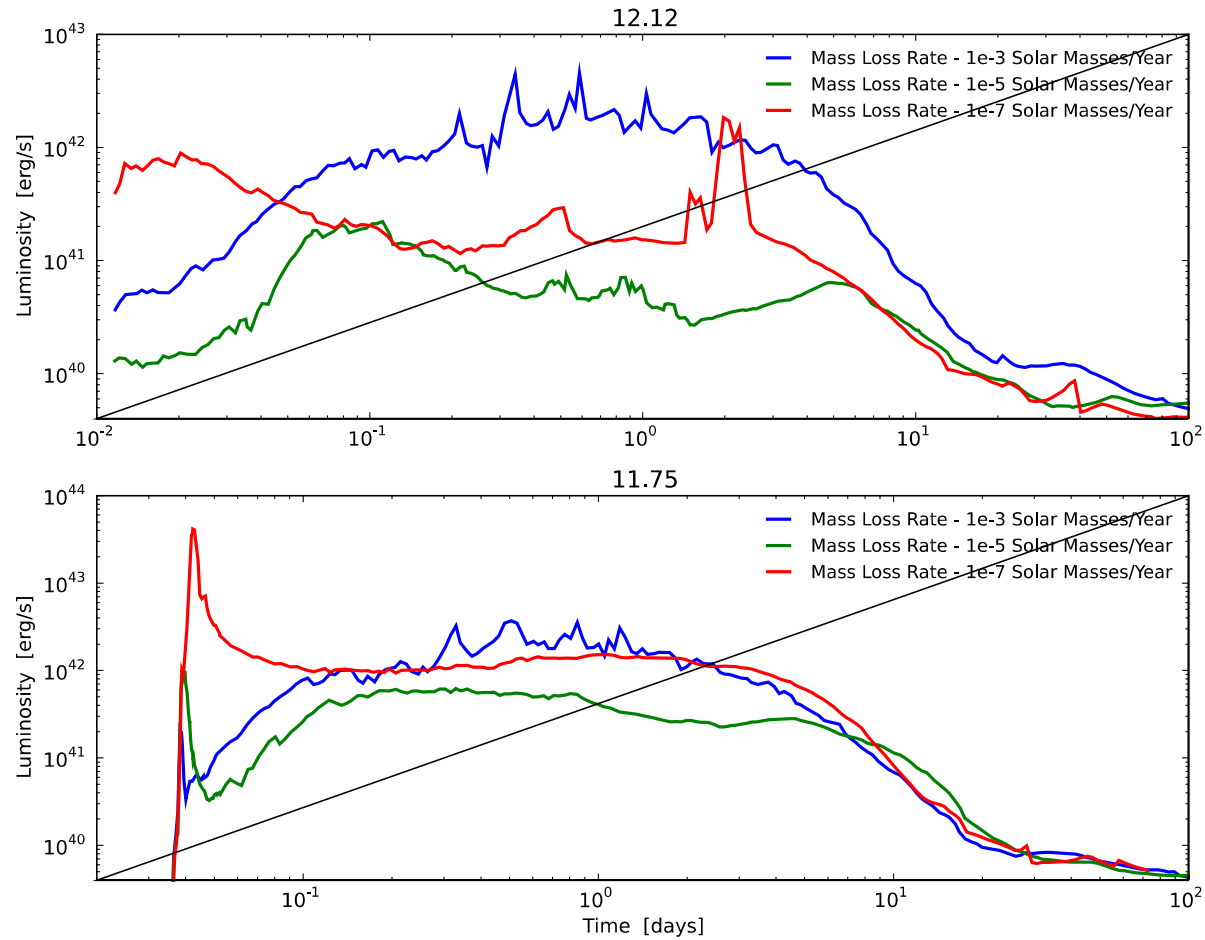


Supernova Simulations

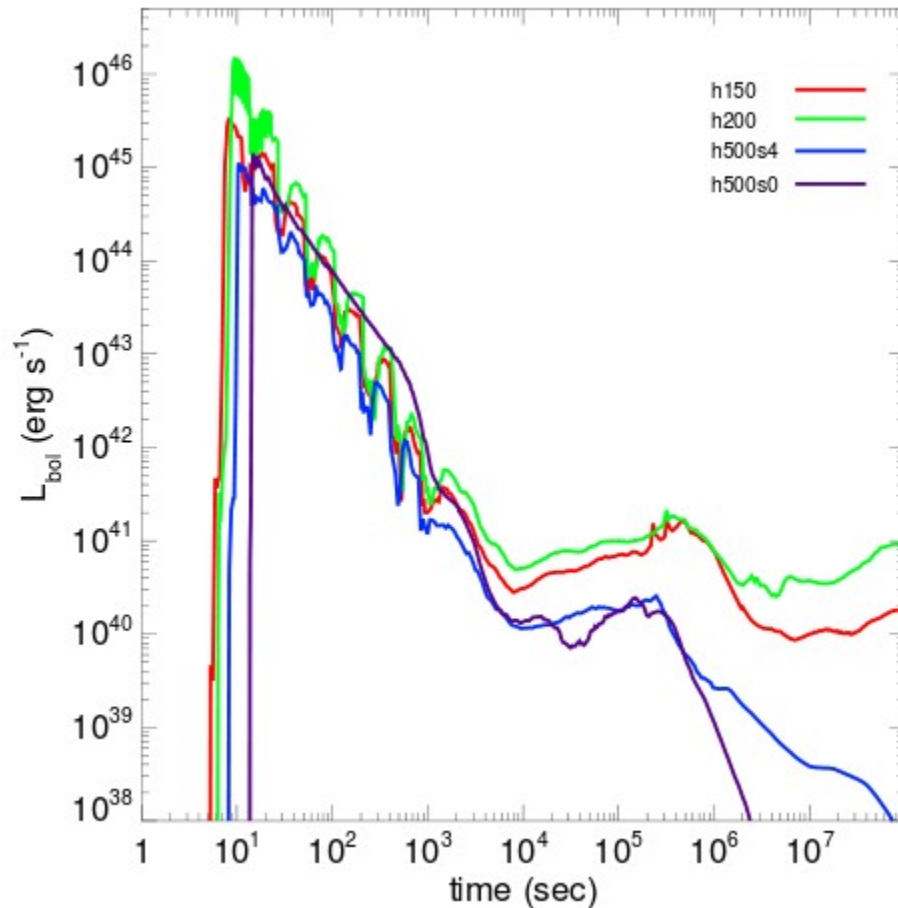
- Stellar evolution/engine
 - 1-D stellar evolution codes -Tycho/Kepler
- Evolution of explosion
 - 1-D radiation hydrodynamics - RAGE
- Post-process spectra
 - 2-D ray tracing with 14,900 energy groups



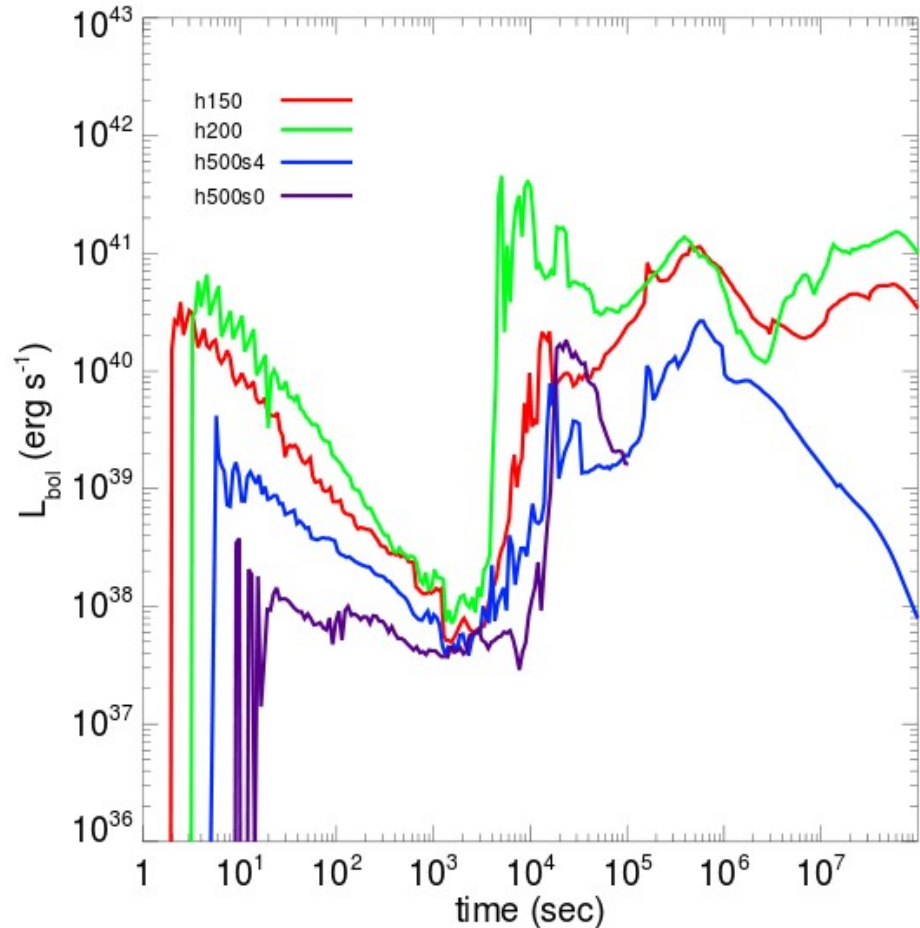
- Mass removal in a 23 Solar Mass star
 - Strong winds or large ejecta events
 - Assume star does not have time to adjust structure



Pair Instability Supernovae



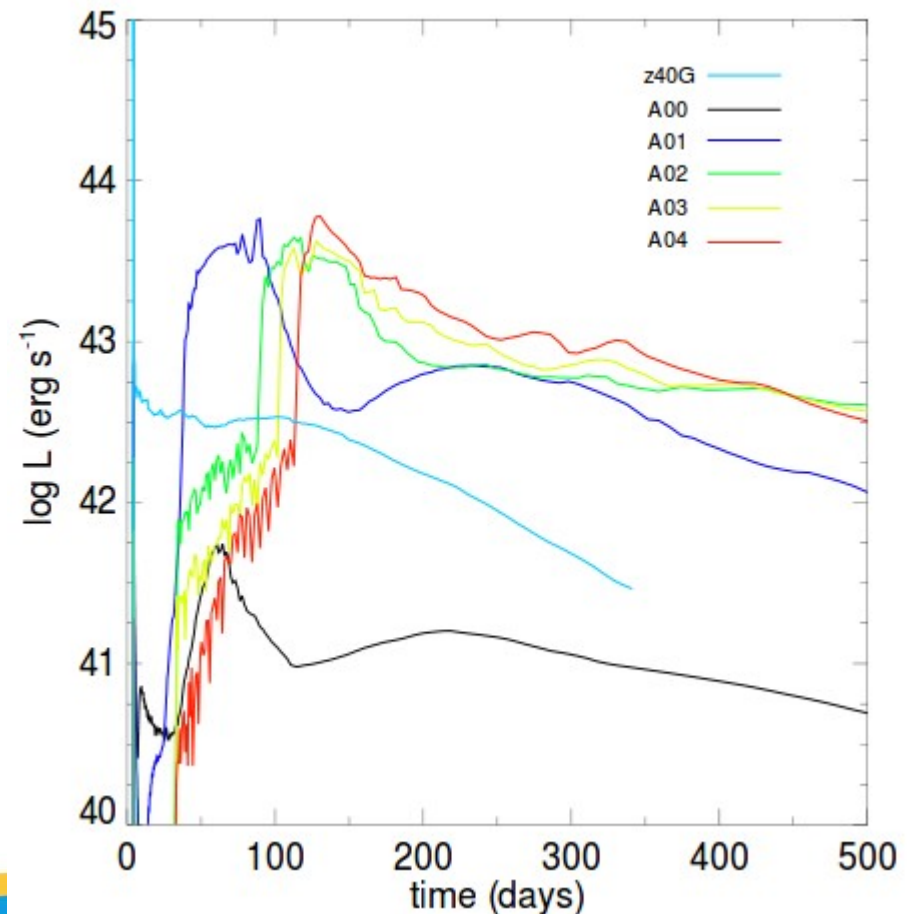
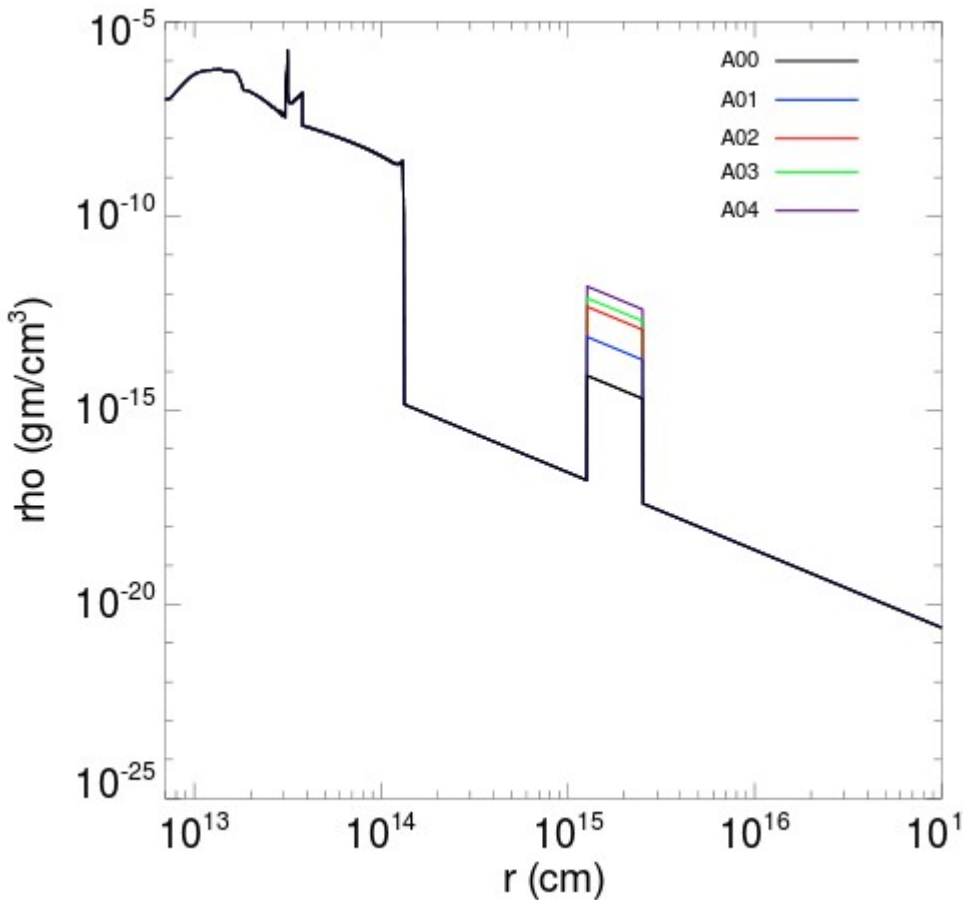
$10e-10$ $M_{\text{sun}}/\text{year}$



$10e-4.1$ to $10e-48$ $M_{\text{sun}}/\text{year}$



- Circumstellar shells interactions
 - 40 Msun progenitor
 - Shell masses of 0.1, 1, 6, 10, 20





- LANL Supernova Lightcurve team

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