

# Shock-Induced Dust Formation by Supernovae

**The Science Question:** Can dust form in the dense region surrounding a recently exploded star?

## The Findings:

- A shock from the supernova explosion propagates through the region surrounding the exploded star.
- Dust can form in the warm, dense gas after the shock travels through it.
- However, strong radiation from the forward and the reverse shock impedes dust formation until a year post-explosion when the shock weakens.
- Large amounts of dust can form in the region surrounding the exploded star.

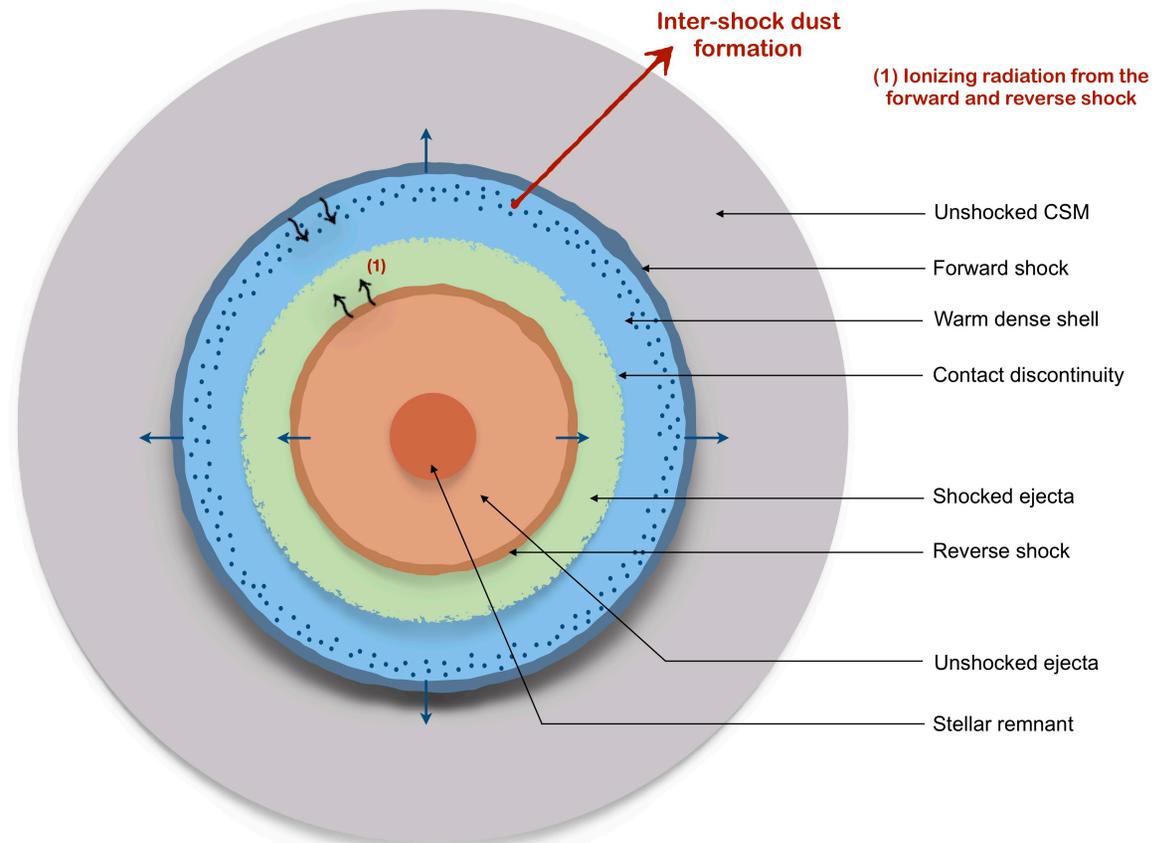
## The Impact:

We quantify the mechanism and the amount of dust in a supernova where dust formation is controlled by the radiation from the forward and the reverse shock.

## The General Importance:

Supernova explosions are an important source of cosmic dust in the local as well as early universe, which is the building block of planets.

Schematic picture of a supernova & its surrounding region



Arkaprabha Sarangi (665/CUA), Eli Dwek (665), Richard G. Arendt (665/UMBC), "Delayed Shock-induced Dust Formation in the Dense Circumstellar Shell Surrounding the Type II<sub>n</sub> Supernova SN 2010jl", *The Astrophysical Journal*, 859, 66, 2018