Supernovae as Drivers of Dust Evolution in Galaxies

The presence of dust in galaxies has a profound effect on the physical, chemical, and thermal state of their interstellar media (ISM). Despite its significant role in the astrophysical processes governing galaxy evolution, the nature, origin, and evolution of dust are still not well-understood. Dust grains are primarily formed in the ejecta of core collapse supernovae (SNe) and mass outflows from evolved stars, and then subsequently processed and destroyed by SN shocks expanding into the surrounding ISM. The amount of dust destruction in the ISM determines whether a galaxy’s dust budget can be balanced by dust formation in stellar sources, or if an additional supply of dust is required.

I will summarize the recent progress on the study of dust formation and processing in supernova remnants (SNRs), including observations of dust heated by pulsar winds that reveal important information about the properties of pristine SN-condensed grains. I will also discuss the balance between dust formation and destruction by SNe and its implications for dust evolution models and our understanding of the origin of interstellar dust in galaxies.