**Service d'Astrophysique**
SÉMINAIRE

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**CEA Saclay, Orme des Merisiers Bât 709, p 220**

# DUST FORMATION AND NUCLEOSYNTHETIC LAYERS OF YOUNG SUPERNOVA REMNANTS WITH SPITZER


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Recent discovery of huge quantities of dust in galaxies and quasars at very high redshift suggests that dust were produced efficiently in the first generation of supernovae. Young supernova remnants are viable laboratories for studying dust formation. We performed Spitzer Infrared Spectrograph (IRS) mapping and Infrared Array Camera (IRAC) observations of the young supernova remnant, Cassiopeia A, and IRS staring observations toward 1E0102-79.2 and Tycho. The Spitzer IRAC images show that the IRAC bands each present a different view of Cas A and highlight different layers of the explosion. In the IRS spectra, gas lines and continuum emission were prominent at positions, and the detected lines include Ar, Ne, O, Si, S and Fe. While Ar and Ne maps show strong collections of knots, prominent at the shell, the line images uncover unshocked ejecta detected by Si and S emission. The dominant continuum exhibits a broad feature peaking at 21 micron, and a silicate emission feature at 9.8 micron. The continuum emission can be fit by plausible SNe condensates, with Mg proto-silicate, amorphous SiO2, and FeO grains to match the 21 micron bump and MgSiO3 to match the 9.8 micro feature. The dust compositions indicate that the dust was formed in Si and S layers. A line-free 19-23 micron dust map shows remarkable similarity to the Ar II ejecta map, confirming that dust is indeed freshly formed in the ejecta. Two additional types of dust are observed with compositions suggesting Carbon and Oxygen-Aluminum nucleosynthetic layers, respectively. I will discuss the distribution of the different types of dust, and dust mass. The dust formation in the other two young supernova remnants of 1E0102-79.2 and Tycho will be discussed and compared to that in Cas A.


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Le cafe sera servi 10 minutes avant
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