Dust in the remnant of SN1987A - when, where and how it formed

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We present new 3D radiative transfer models of the remnant of SN 1987A. The detection of the remnant at submillimetre wavelengths by the *Herschel Space Observatory* implies the presence of a large quantity of dust, and we place new constraints on when, where and how this dust has formed by constructing models to fit observed optical-IR spectral energy distributions 615, 775, 1153 and 8515 days after the explosion.

We find that the vast majority of the dust present by day 8515 must have formed after day 1153; at day 1153, we find a strong upper limit of $0.01M_{\odot}$ of dust in the remnant but by day 8515, models with around $1M_{\odot}$ of dust are required to fit the *Herschel* observations.

We find that the dust shell giving the best fit to the models at day 615 gives good fits at all other epochs as well when expanded at constant velocity and the dust mass varied. By day 8515, however, a good fit is only possible if the dust size distribution extends to larger radii than it did at previous epochs. This could suggest that the huge increase in the dust mass after day 1153 occurred by accretion onto the dust grains formed at earlier epochs.