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A Spitzer Search for the Missing Supernovae in the Galactic Nuclei of ULIRGS

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Abstract. Supernova (SN) rates serve as an important probe of star formation models and initial mass functions, particularly at high redshifts due to the SN intrinsic luminosity. Ground-based optical surveys, however, typically discover nearly ten times fewer SNe than predicted, challenging our understanding of massive star formation and evolution. These results are generally attributed to the high dust extinction associated with the nuclei of star forming galaxies, such as Ultra Luminous InfraRed Galaxies (ULIRGs). Near-infrared surveys have been unsuccessful due to extinction values exceeding $A_V > 25$ mag, and even on an 8-m AO system, subtraction algorithms used to find the SNe inevitably leave large residuals associated with the inner 2" of the galactic nucleus, which is where a majority of the SNe occur. A successful survey must be conducted at longer wavelengths and with a space-based telescope, which has stable seeing that reduces the necessity for any subtraction algorithms and, therefore, residuals. Here we present ongoing work from our 300 hour Spitzer 3.6 micron survey for dust-extinguished SNe in the nuclear regions of ULIRGs within 200 Mpc. The direct product of this study will be an improved understanding of the connection between the far-IR luminosity of ULIRGs and massive star formation.

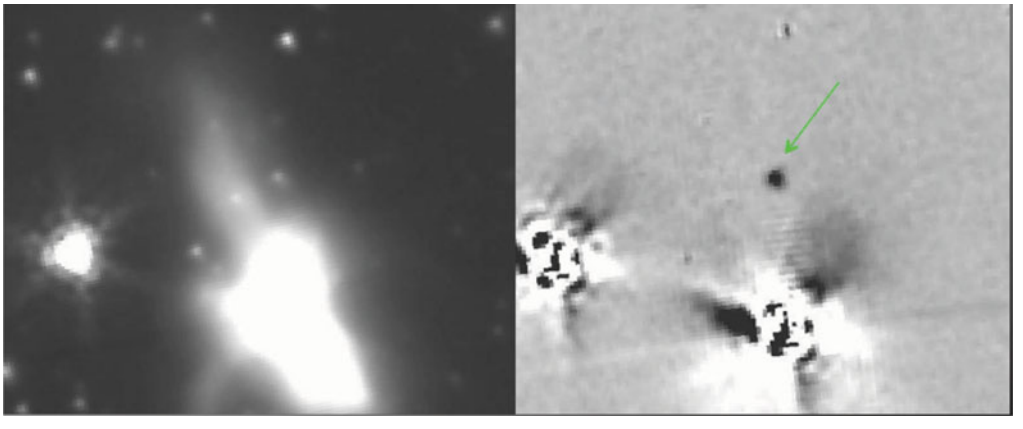

Figure 1. *Spitzer* images of SN 2013dc (left) before and (right) after template subtraction. This is one of the SNe discovered by our program in the nearby ULIRG NGC6240.