N34a Radio and Submillimetre Constraints on the Pulsar-Driven Supernova Model

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Several classes of energetic transients, including superluminous supernovae (SLSNe) and gamma-ray bursts (GRBs), require more energy than conventionally available in a supernova. Several energy sources have been suggested, including a rapidly-rotating highly-magnetized pulsar, but can not be distinguished by the thermal emission of the transient. The smoking gun for this model should be late-time non-thermal emission, detectable after the ejecta becomes optically thin. We predicted the emission from several sources, and conducted follow-up observations in both radio (using VLA) and submillimetre (using ALMA and NOEMA). We found a weak signal from PTF10hgi, which was also detected at higher frequency by Eftekhari+ (2019), but no other detections, even though several observations had sensitivities well below our lower limits. I talk about the implications for the pulsar driven model, and some revisions which may explain the previous non-detections.