Contribution ID: **13** Type: **not specified**

SN 2019vxm: A Shocking Coincidence between Fermi and TESS

Monday, 9 February 2026 10:20 (20 minutes)

Shock breakout and, in some cases, jet-driven high-energy emission are increasingly recognized as key signatures of the earliest phases of core-collapse supernovae, especially in Type IIn systems due to their dense, interaction-dominated circumstellar environments. We present a comprehensive photometric analysis of SN 2019vxm, a long-duration, luminous Type IIn supernova, $M_V = -21.41 \pm 0.05$ mag, observed from X-ray to near-infrared. SN 2019vxm is the first superluminous supernovae Type IIn to be caught with well-sampled *TESS* photometric data on the rise and has a convincing coincident X-ray source at the time of first light. The high-cadence *TESS* light curve captures the early-time rise, which is well described by a broken power law with an index of $n = 1.41 \pm 0.04$, significantly shallower than the canonical $n = 2$ behavior. From this, we constrain the time of first light to within 7.2 hours. We identify a spatial and temporal coincidence between SN 2019vxm and the X-ray transient GRB191117A, corresponding to a 3.3σ association confidence. Both the short-duration X-ray event and the lightcurve modeling are consistent with shock breakout into a dense, asymmetric circumstellar medium, indicative of a massive, compact progenitor such as a luminous blue variable transitioning to Wolf-Rayet phase embedded in a clumpy, asymmetric environment.

Author: LANE, Zachary (University of Canterbury)

Co-authors: Dr REST, Armin (Johns Hopkins University); Dr RANSOME, Conor (University of Arizona); RIDDEN, Ryan (University of Canterbury); Ms REST, Sofia

Presenter: LANE, Zachary (University of Canterbury)

Session Classification: Supernovae