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SUPPLEMENTARY INFORMATION

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A fast-evolving luminous transient discovered by K2/Kepler

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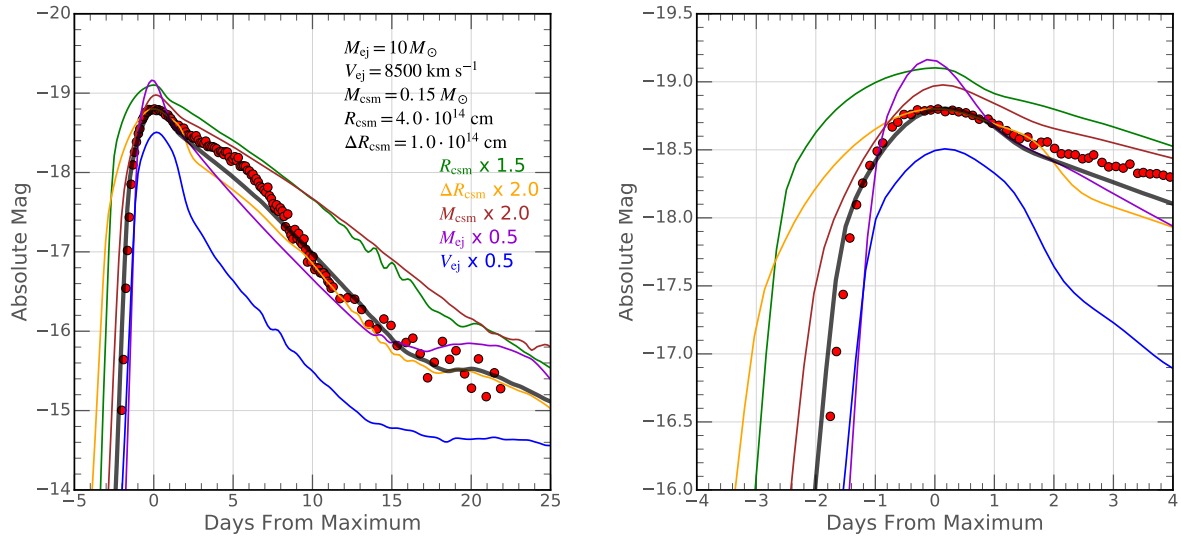
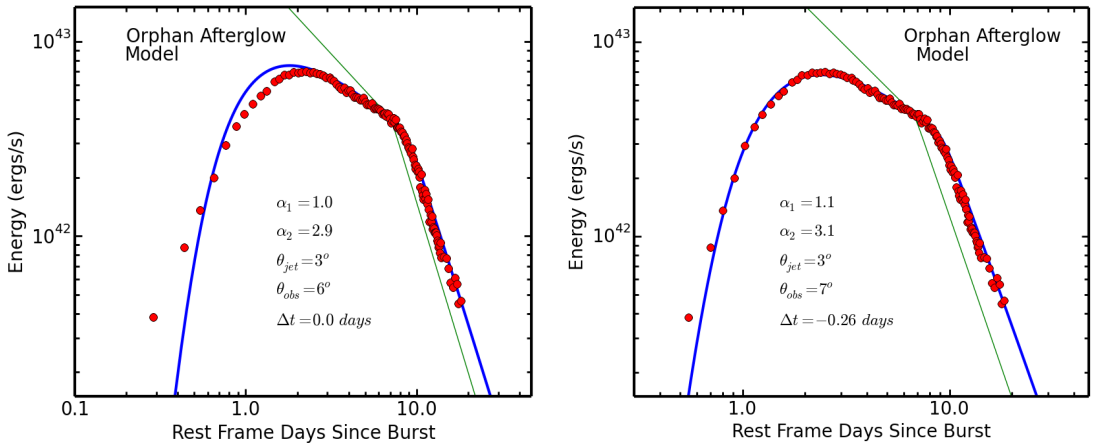
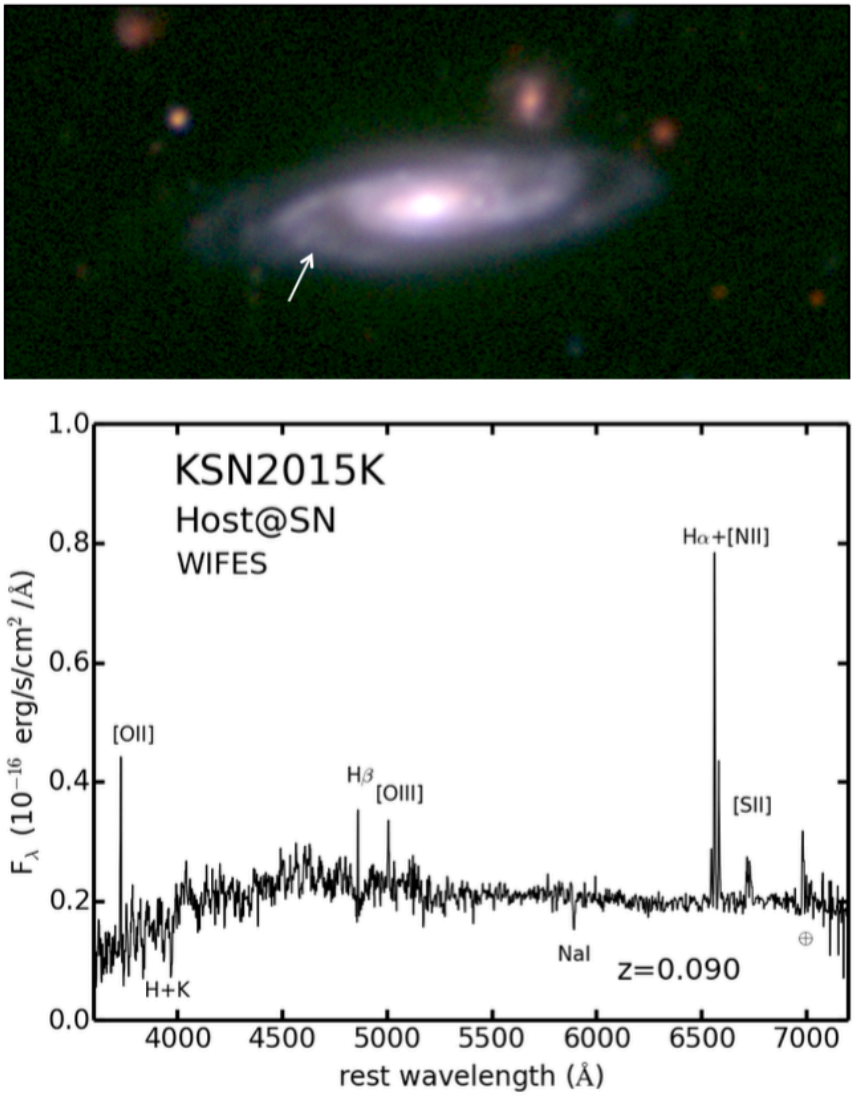


Supplementary Figure 1: **CSM interaction models.** *Left:* The KSN2015K data (red points) compared to numerical radiation hydrodynamics simulations of the CSM interaction models (lines). The best-fit model (black line, parameters shown inset) is able to capture the fast rise and peak magnitude of KSN2015K as well as the rapid decline due to cooling of the shock-heated CSM and ejecta. *Right:* The CSM interaction model around peak.



Supplementary Figure 2: **Orphan afterglow models.** The KSN2015K light curve (red points) compared to orphan afterglow models (blue lines). Observing a GRB off the jet axis at an angle larger than the jet opening angle means the gamma-rays are not seen, but the afterglow may become visible as the shock slows and the relativistic beaming broadens. The green lines show the model light curve if the GRB were viewed directly along the jet axis. *Left:* For the first model, the time of the GRB is assumed to be at the moment of first light ($\Delta t = 0$). However the orphan afterglow model rises too quickly to match the observed light curve. *Right:* In the second model, the time of the GRB is assumed to be about 6 hours before first light ($\Delta t = -0.26$ days). This has only a minor effect on the model itself, but forces the light curve rise more steeply and better match the model.



Supplementary Figure 3: **Host galaxy 2MASX-J13315109-1044061.** *Top:* Pseudo-color image of the host galaxy of KSN2015K made using V and I band images from Keck and SDSS-g band from the LBT. The arrow points to the position of the transient. *Bottom:* The WiFeS spectrum of the host galaxy. The spectrum is the sum of four spaxels covering one square arcsecond at the location of the transient. The large Hα equivalent width suggests on-going star-formation. The absorption at Hβ implies a significant post-starburst population.