SUPERNOVAE

Explosion in a galaxy far, far away

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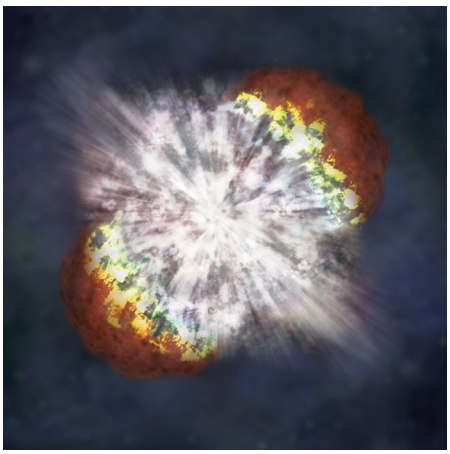
https://arxiv.org/abs/1712.04535



Credit: NASA/CXC/M.Weiss.

Supernova explosions (artist's impression pictured) mark the end of massive stellar evolution and can be used to study both their progenitor stars and their surrounding mediums. Superluminous supernovae (SLSNe) are rare but extremely energetic supernovae that can probe stellar evolution and the interstellar medium at very high redshifts. Mathew Smith and collaborators recently reported the discovery of such a SLSN when the Universe was only a quarter of its current age.

The discovery was made in the multiband visible data of the Dark Energy Survey, an ongoing programme mapping hundreds of millions of galaxies to understand the accelerating expansion of our Universe. Smith et al. used ground and space telescopes to follow up the initial detection and confirmed the redshift of the SLSN based on absorption features originating in its host galaxy. Multi-wavelength photometric analysis led the authors to conclude that the object is powered by the slowing down of a rapidly rotating magnetar.

This is the farthest known SLSN and its discovery allowed the detailed study of the ultraviolet spectrum of the object as it shifted into the optical, something typically not possible for local SLSNe. Comparison with the limited available data from the low-redshift Universe revealed little evolution of the observational properties of these objects with redshift. However, unlike their local counterparts, distant SLSNe should appear red in colour due to the redshifting of their ultraviolet emission into the visible bands. Smith et al. estimated that facilities such as Euclid and the Wide Field Infrared Survey Telescope will detect SLSNe out to redshifts of 3.7 and 6.6, respectively.

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