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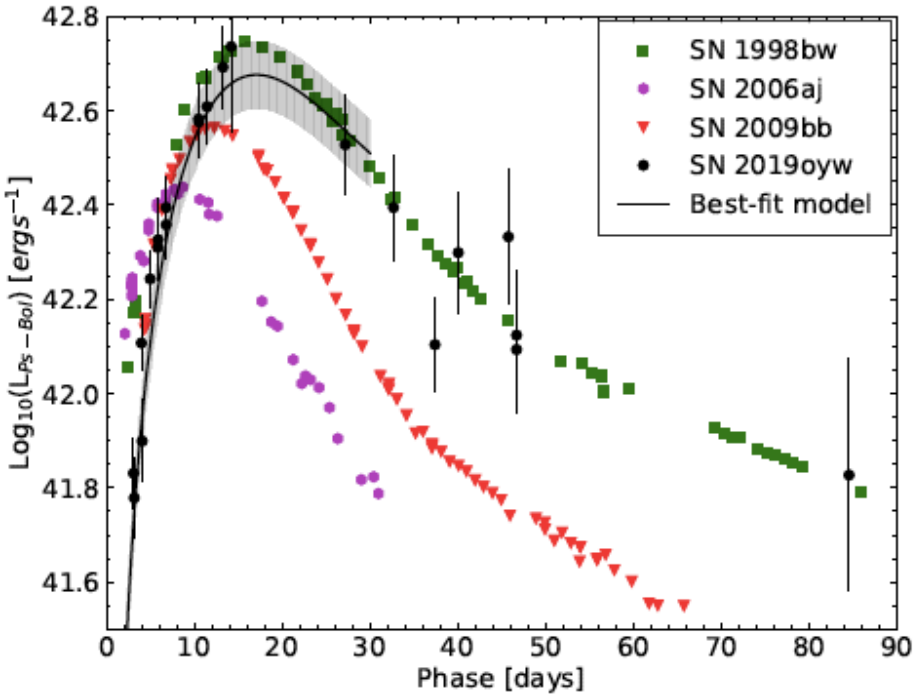
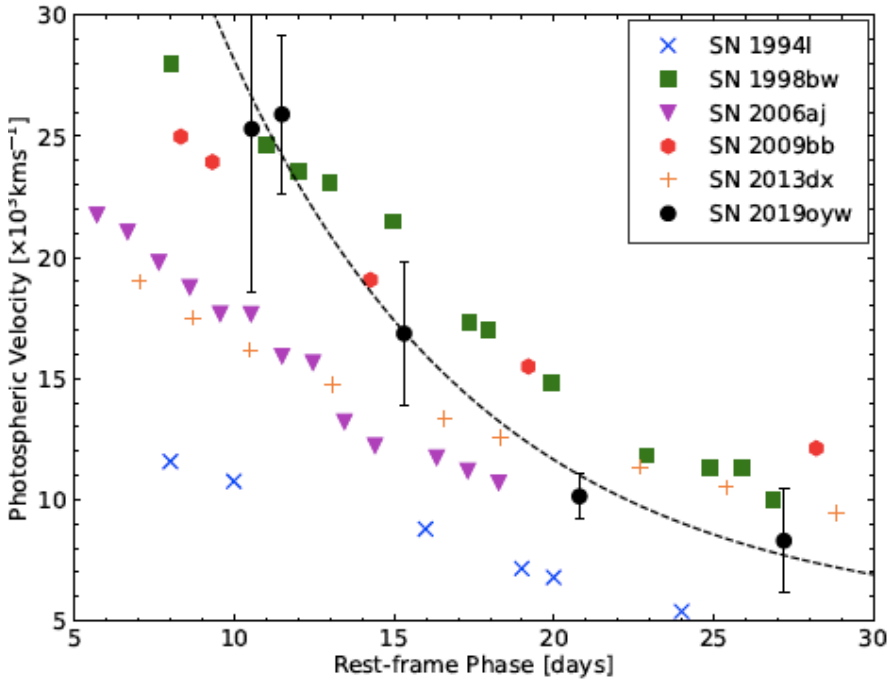
# The asymmetry at the heart of long GRB explosions

# SN2019oyw associated with GRB190829A

**GRB190829A is one of a handful of GRBs with afterglows detected at TeV energies. We have searched and followed up the underlying supernova with various telescopes, including VLT. The luminosity at peak is similar to that of the prototypical GRB-Supernova SN1998bw (left); the photospheric velocity also exhibits a similar time profile (right). The study of this obejct was part of a student thesis and is being finalized for publication (Medler et al., in prep). No major critical issues are foreseen. The signal-to-noise ratio of the data is limited, which jeopardizes the afterglow subtraction and therefore the accurate determination of SN properties**



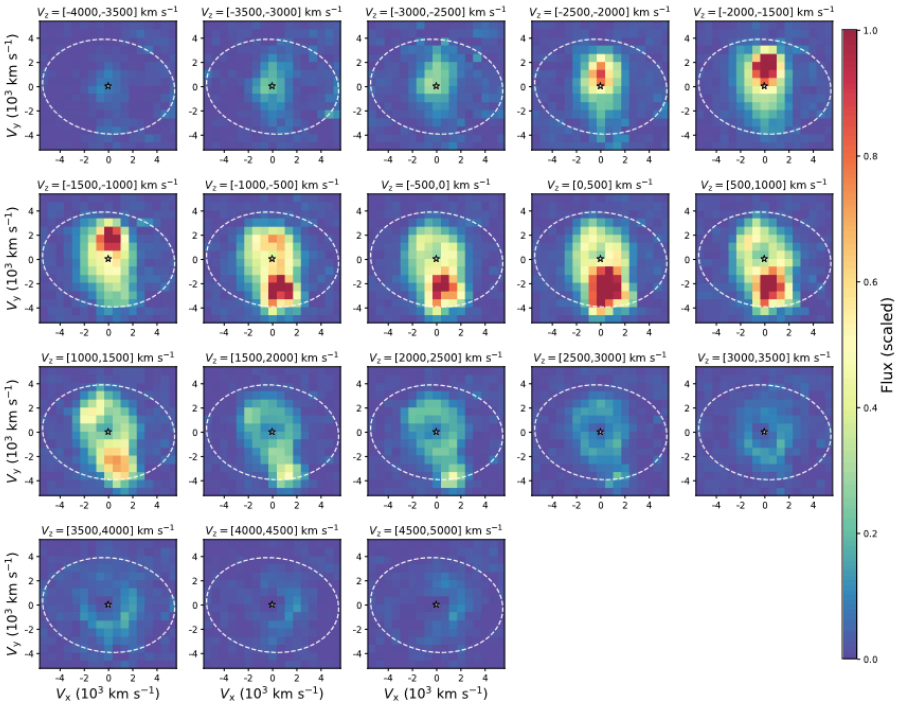



# PTF10nmn: core-collapse or pair-instability supernova

**Following the controversial case of SN2007bi, considered the first super-luminous supernova with plausible pair-instability supernova characteristics, the search for more analogous phenomena has yielded a few candidates, including PTF10nmn, of similar luminosity and spectrum. We have gathered various spectra, including one taken with the VLT in nebular phase, and photometry, including HST, to characterize this object (Yaron et al., in prep). No major critical issue is foreseen; it is necessary to homogenize the dataset, resulting from data taken at multiple facilities and analyzed in many different ways.**

# End-to-end mapping of core-collapse explosion asymmetry: from massive progenitor to supernova remnant

**The recent JWST NIRSPEC observations of SN1987A (Larsson et al. 2023) have revealed a high degree of asymmetry in the distribution of iron in the ejecta. This distribution is reminiscent of the polar geometry of iron proposed for core-collapse Sne based on their nebular spectra. SN1987A's remnant is sufficiently young to have retained the original high anisotropy, which can now be resolved by accurate measurements.**




Images of the [Fe I] 1.443 μm emission from the ejecta as a function of Doppler shift (from Larsson et al. 2023)

**This analogy calls for a reanalysis of the archival nebular spectra of SN1987A, that, combined with the recent JWST spectra may reconnect to the asymmetry of the progenitor stellar core. No particular criticality is foreseen in this project, except the fact that, owing to the large inclination angle of SN1987A nebula axis, the exercise of identifying the characteristic nebular emission line profile may be complex.**