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Shedding light on the brightest supernovae

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Superluminous supernovae are a class of exceedingly bright transients whose luminosity cannot be comfortably explained by the standard 56Ni-decay picture. The quest for an alternative scenario has pointed at the contribution of a nascent millisecond magnetar and/or at the interaction of the supernova ejecta with a circumstellar medium surrounding the progenitor star; however, some of the observed photometric and spectroscopic features of many superluminous supernovae are seemingly reminiscent of a 56Ni-decay contribution. I present the results of the spectrophotometric observational campaigns of three superluminous supernovae and discuss the observational data in the framework of the magnetar and the circumstellar-interaction scenario, and I suggest that some superluminous supernovae might be the UV-optical-NIR counterpart of a magnetorotational instability-driven core collapse.

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