

STARS

Lost blue variable

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The last time that somebody checked, in 2011, the luminous blue variable (LBV) star dominating the broad H β line of the low-metallicity dwarf galaxy PHL 293B was just fine. Perhaps looking a little peaky, having been in an eruptive state for much of 2001–2011, but nothing unusual for an LBV. However, when Andrew Allan and collaborators went back with the Very Large Telescope (VLT) in 2019, there was no sign of it. What had happened? Allan and co-workers put forward two theories: the star had hidden itself behind an eruptive cloak of dust, or it had collapsed to a massive black hole without any trace.

The researchers dig deeper into the mystery by delving into the archives. An H α spectrum from 2016 also lacked the expected stellar signature of the LBV, narrowing down the time of disappearance to 2011–2016. Modelling the LBV prior to disappearance, Allan et al. calculate that it would have had to have dropped at least 85% in luminosity in order to pass undetected in VLT/X-shooter spectra. This idea has potential when combined with a shift to higher stellar effective temperatures and a moderate screen of obscuring warm dust.

Alternatively, the 85–120 M_{\odot} LBV could have collapsed to a 40–90 M_{\odot} black hole. No bright supernova was seen, but there is a gap in photometric coverage between 1995 and 1998, leaving the possibility open. In this case, the availability of pre- and post-explosion spectra would be a rarity, with only one confirmed supernova — 1987A — meeting that criterion.

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