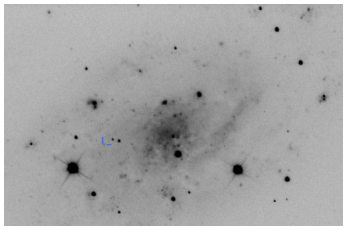
LBV (SNhunt225) in **NGC 2403** new outburst pinpointed by Paolo Campaner on 2nd November 2014. Also classified as **PSN J07370423+6535509**. Mag 18.5.



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ATEL #6756 ATEL #6756

Title: Spectroscopic classification and progenitor identification of SNhunt225

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We report that an optical spectrum (range 330-900 nm; resolution 1.7 nm) of PSN J07370423+6535509 = SNhunt225 (CBAT "Transient Object Followup Reports") was obtained at the Nordic Optical Telescope (+ ALFOSC) on Nov. 24.2 UT. The spectrum shows a red continuum with a weak, unresolved Halpha in emission. The position of the narrow Halpha is consistent with that expected from the modest recessional velocity of the host galaxy NGC 2403 (V_rec = 133 km/s; Sellwood & Sanchez, 2010, MNRAS, 404, 1733, via NED). The spectrum is very similar to that of the "supernova impostor" UGC 2773 OT2009-1 (Foley et al. 2011, ApJ, 732, 32), and therefore SNhunt225 is most likely an LBV-like eruption of a massive star.

Using the acquisition image of SNhunt225 obtained at NOT Telescope (+ALFOSC), we geometrically matched deep archival Hubble Space Telescope (HST; available at Hubble Legacy Archive) image mosaics obtained with different configurations: F439W (~B) filter taken with WFPC2 on 1994 April (GO-5383; PI: L. Drissen);

F475W (~SDSS g), F606W (~V) and F814W (~I) taken with ACS/WFC on 2004 August (GO-10182; PI: A. Filippenko). We isolated a clear source (with a precision between 0.05" and 0.08") in the all HST images, at the accurately measured position of SNhunt225: R.A. = 07h37m04.189s and Dec. = +65d35m46.957s.
A finder chart for the candidate progenitor is provided at

http://ttt.astro.su.se/~ftadd/positionsnhunt225_f606w.jpeg .

Using the Dolphot package (Dolphin 2000 PASP, 112, 1383), the magnitudes of the recovered HST source are: F439W = 20.94 +/- 0.01, F475W = 20.75 +/- 0.01, F606W = 20.43 +/- 0.01 and F814W = 20.11 +/- 0.01. Assuming a distance modulus to NGC 2403 of 28.29 +/- 0.15 mag, as inferred from the average recessional velocity of the galaxy corrected for the Local Group infall into the Virgo cluster + the Great Attractor + the Shapley Supercluster (NASA/IPAC Extragalactic Database - NED), and adopting Galactic reddening of E(B-V) = 0.035 (Schlafly & Finkbeiner 2011, ApJ, 737, 103), we obtain absolute magnitudes of -7.49, -7.67, -7.97 and -8.24 in the (approximate) B, SDSS g, V and I bands, respectively, and a intrinsic colour of B-V = 0.48 mag for the HST source.

We note that the coordinates of SNhunt225 are quite close, but not coincident, to those reported in the literature for the variable V22 in NGC 2403 (R.A. = 07h37m04.75s, Dec=+65d35m49.7s, J2000.0;
Artyukhina et al. 1996, General Catalogue of Variable Stars, Vol. V.: Extragalactic Variable Stars). V22 was classified as a likely LBV by Tamman & Sandage 1968, ApJ 151, 825. However, from a visual inspection of the identification map (Figure 3 in Tamman & Sandage, 1968), we suggest that SNhunt225, the recovered HST source and the historical V22 may be the same object.
The approximate B-band magnitude in the HST image is consistent with those observed for V22 by Tammann and Sandage from 1910 to 1963 (in the range 20.2 to 21.8 mag; see their Figure 10).
For this reason, we cannot rule out that SNhunt225 can be a re-brightnening of V22, and the apparent mismatch in the coordinates is due to previous incorrect position measurements of V22.