A Blue Point Source at the Location of Supernova 2011dh

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We present Hubble Space Telescope (HST) observations of the field of the Type IIb supernova (SN) 2011dh in M51 performed at â‰ˆ1161 rest-frame days after explosion using the Wide Field Camera 3 and near-UV filters F225W and F336W. A star-like object is detected in both bands and the photometry indicates it has negative (F225W - F336W) color. The observed object is compatible with the companion of the now-vanished yellow supergiant progenitor predicted in interacting binary models. We consider it unlikely that the SN is undergoing strong interaction and thus estimate that it makes a small contribution to the observed flux. The possibilities of having detected an unresolved light echo or an unrelated object are briefly discussed and judged unlikely. Adopting a possible range of extinction by dust, we constrain parameters of the proposed binary system. In particular, the efficiency of mass accretion onto the binary companion must be below 50%, if no significant extinction is produced by newly formed dust. Further multiband observations are required in order to confirm the identification of the object as the companion star. If confirmed, the companion star would already be dominant in the UV-optical regime, so it would readily provide a unique opportunity to perform a detailed study of its properties.

Reference: ApJ 793, L22
Status: Manuscript has been accepted

Weblink: http://adsabs.harvard.edu/abs/2014ApJ...793L..22F

Comments: 6 pages, 3 figures

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