

Accurate fundamental parameters and distance to a massive early-type eclipsing binary in the Danks 2 cluster

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We present a study of the properties of the O-type, massive eclipsing binary 2MASS J13130841-6239275 located in the outskirts of the Danks 2 cluster in the G305 star-forming complex, using near-infrared spectroscopy from VLT/ISAAC. We derive the masses and radii to be $24.5 \pm 0.9 M_{\odot}$ and $9.2 \pm 0.1 R_{\odot}$ for the primary and $21.7 \pm 0.8 M_{\odot}$ and $8.7 \pm 0.1 R_{\odot}$ for the secondary component. In addition, we evaluate the sensitivity of our parameters to the choice of the spectral features used to determine the radial velocities. Both components appear to be main-sequence O6.5-O7 type stars at an age of ~ 5 Myr, which is in agreement with the age of the cluster. A high visual extinction of $A_{\{5495\}} = 11.9 \pm 0.1$ mag is reported, which is likely attributed to the cold molecular gas contaminating the north-east region of the cluster. By fitting the spectral energy distribution of the system to the available BVI_cJHK_s photometry, we determine a distance to the system of 3.52 ± 0.08 kpc with a precision of 2%, which is the most well-determined distance to the Danks 2 cluster and the host complex reported in the literature.

Reference: A&A, in press.

Status: Manuscript has been accepted

Weblink: <http://arxiv.org/abs/1508.05939>

Comments: 13 pages, 9 figures, 6 tables.

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