Near-infrared study of the stellar population of Sh2-152

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Context: The discovery of new massive star clusters and massive stellar populations in previously known clusters in our Galaxy by means of infrared studies has changed our view of the Milky Way from an inactive to an active star-forming machine. Within this scenario, we present a near-infrared spectrophotometric study of the stellar content of the compact H II region Sh2-152.

Aims: We aim to determine the distance, extinction, age, and mass of Sh2-152, using for the first time near-infrared stellar classification for several sources in the region.

Methods: Using our near-infrared (J, H, and Ks) photometry and the colour-magnitude diagram for the cluster field, we selected 13 bright stars, candidate members of the reddened cluster's main sequence, for H- and K- spectroscopy and spectral classification. This near-infrared information was complemented with an optical spectrum of the ionizing central star to confirm its spectral nature.

Results: From the 13 spectroscopically observed stars, 5 were classified as B-type, 3 as G-type, 2 were young stellar objects (YSOs), and 3 remained unclassified (because of the poor data quality). The cluster's extinction varies from A_(Ks)=0.5 to 2.6 magnitudes (A_V=4.5 to 24 magnitudes) and the distance is estimated to be 3.21Â±0.21 kpc. The age of the cluster is younger than 9.4 Myr and the lower limit to the total mass of the cluster is (2.45Â±0.79)Â·10Â³ M_(Sun). We compare the number of ionizing photons emitted from the OB-type stars with the Lyman continuum photons derived from the radio observations and conclude that both quantities are consistent for the central region of Sh2-152. In contrast, the main ionizing source of the lower region remains unidentified.

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