

New luminous blue variables in the Andromeda galaxy

Sholukhova O., Bizyaev D., Fabrika S., Sarkisyan A., Malanushenko V., Valeev A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 The Authors. We performed spectroscopy of five luminous blue variable (LBV) candidates and two known LBV stars (AE And and Var A-1) in M31. We obtained the same-epoch near-infrared (NIR) and optical spectra of these stars. The NIR spectra were taken with the Triplespec spectrograph at the 3.5-m telescope at the Apache Point Observatory, and the optical spectroscopy was carried out using the SCORPIO focal reducer at the 6-m BTA telescope (Special Astrophysical Observatory of the Russian Academy of Science). The candidates demonstrate typical LBV features in their spectra: broad and strong hydrogen lines, and He I, Fe II and [Fe II] lines. All our candidates show photometric variability. We develop a new approach to the estimation of LBV parameters based on the inherent property of LBVs to change their spectral type at constant bolometric luminosity. We compare the spectral energy distributions of the variable stars obtained in two or more different states, and we estimate the temperatures, reddening, radii and luminosities of the stars using this method. Two considered candidates (J004526.62+415006.3 and J004051.59+403303.0) have to be classified as new LBV stars. Two more candidates are, apparently, B[e] supergiants. The nature of one more star (J004350.50 + 414611.4) is not clear. It does not show obvious LBV-like variability and remains an LBV candidate.

<http://dx.doi.org/10.1093/mnras/stu2597>

Keywords

Galaxies: individual: M31, Infrared: stars, Stars: emission-line, be, Stars: massive, Stars: variables: S Doradus