

Discovery of the first B[e] supergiants in M 31

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B[e] supergiants (B[e]SGs) are transitional objects in the post-main sequence evolution of massive stars. The small number of B[e]SGs known so far in the Galaxy and the Magellanic Clouds indicates that this evolutionary phase is short. Nevertheless, the strong aspherical mass loss occurring during this phase, which leads to the formation of rings or disk-like structures, and the similarity to possible progenitors of SN1987A emphasize the importance of B[e]SGs for the dynamics of the interstellar medium as well as stellar and galactic chemical evolution. The number of objects and their mass loss behavior at different metallicities are essential ingredients for accurate predictions from stellar and galactic evolution calculations. However, B[e]SGs are not easily identified, as they share many characteristics with luminous blue variables (LBVs) in their quiescent (hot) phase. We present medium-resolution near-infrared K-band spectra for four stars in M 31, which have been assigned a hot LBV (candidate) status. Applying diagnostics that were recently developed to distinguish B[e]SGs from hot LBVs, we classify two of the objects as bonafide LBVs; one of them currently in outburst. In addition, we firmly classify the two stars 2MASS J00441709+4119273 and 2MASS J00452257+4150346 as the first B[e]SGs in M 31 based on strong CO band emission detected in their spectra, and infrared colors typical for this class of stars.

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