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The circumstellar medium around five LBV stars through the light of NIKA2 and the Virtual Observatory.

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Abstract

Luminous Blue Variable (LBV) stars are post-main sequence massive objects in a very fast ($10^4\,a$) transitional stage characterized by dense winds and impressive mass eruptions, as they are close to the Eddington limit. LBVs profoundly affect their surroundings, creating ionized and dusty nebulae, some times surrounded by molecular gas. They are great infrared emitters due to their high luminosity and the usually high extinction. They have also been detected at cm-wavelengths, dominated by non-thermal emission. The mm/submm regime, however, has not been much investigated. NIKA2 is a highly sensitive continuum camera installed at the IRAM 30m radio telescope near Pico Veleta, Granada. The camera can provide images at 150 and 260 GHz (2 and 1.15 mm of wavelength, approximately), with a field of view of up to 6.5 arcmin. The operational frequencies of NIKA2 are of great interest in the study of LBVs because it is a range where both thermal and non-thermal process compete in their contribution to the SEDs.

In this work we present the results achieved towards a sample of five galactic LBVs obtained using NIKA2 and a set of information gathered using Virtual Observatory tools and archives. We detected emission from the stars themselves, in their close surroundings, and also outside the IR nebulae. All these components depict very different spectral indexes, pinpointing that diverse mechanisms coexist, such as free-free gas emission, thermal dust and synchrotron radiation. We complemented these findings by building the SEDs of the LBV stars, where the contribution from the extended photosphere is clearly separated from warm black (grey) body emission, and non-thermal flux in some cases.

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