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# LBVs with collimated stellar winds and apparent helical nebulae

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## Abstract

The interest in the role of binarity on the massive stars evolution has increased and created a debate in the massive star community regarding the description of Luminous Blue Variables (LBVs). The mass-loss necessary to quickly expel their H-envelope before to evolve as Wolf Rayet has to occur through intense line-driven stellar winds and violent eruptions. The role and the underlying mechanism of these eruptions has not been established.

The majority of the known circumstellar LBV nebulae have a bipolar morphology, indicating an a-spherical mass-loss. The cause is not determined but is usually hypothesized that it is due to fast stellar rotation, presence of a companion star or magnetic fields.

We gathered a multiwavelength dataset of some well-known LBVs, including ALMA, ATCA and VISIR observations. Our data reveal signatures of collimated winds, that seem related to the presence of a companion star and/or to fast rotation. The nebulae appear as helices formed by the precession of the collimated wind, enhancing the hypothesis that the mass-loss is influenced by a companion star.

I will talk about our plan to test this scenario by means of the incoming capabilities.

**Keywords:** circumstellar nebulae, stellar winds

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