Massive stars in Carina from GES, GOSSS & LiLiMaRlin: A new census of OB stars to obtain a reliable distribution of rotational velocities for the O-star population.

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Abstract

The Carina Nebula complex consists of several stellar groups, some bound and some not, immersed in the Car OB1 association, a unique region to study Galactic massive stars. Containing a large number of O-stars, it is the most massive star-forming region within 3 kpc of the Sun. Even though the Carina Nebula harbors hundreds of massive stars, there is no systematic spectroscopic analysis of its early-type members.

In this contribution we present results from Berlanas et al. 2022 (submitted) in which we created the most complete to date census of massive stars in the central part of the Carina Nebula, Car OB1. The final census contains a total of 315 stars, being 17 of them in the background and four in the foreground. Of the 294 stellar systems in Car OB1, 74 are of O type, 214 are of non-supergiant B type and 6 are of WR or non-O supergiant (II to Ia) spectral class. We identified 20 spectroscopic binary systems with an O-star primary, of which 6 are reported for the first time, and another 17 with a B-star primary, of which 12 are new detections. We estimate that our sample is around 90% complete for low to moderate extinction O and early B systems. Thanks to this census and high-resolution spectra from GES and the LiLIMaRlin library, we obtained a reliable distribution of rotational velocities for the O-star population in the GES footprint of Carina (Berlanas et al. 2023, in prep). We find a bimodal structure with the low velocity peak at 60 km s^{-1} and a tail of fast rotators above 200 km s^{-1}, similar to previous studies in other regions except for a shorter tail of fast rotators.

My poster is available at https://doi.org/10.5281/zenodo.7046980