Extreme AO of Massive Stars: Searching for faint companions using VLTI/SPHERE for the CHIPS project

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Abstract

The formation of massive stars remains one of the most intriguing questions in astrophysics today. The main limitations result from the difficulty to obtain direct observational constraints on the formation process itself. Several formation theories have been proposed such as stellar collisions, merging, competitive accretion and monolithic collapse amongst others. In this context, the Carina High-contrast Imaging Project of massive Stars (CHIPS) aims to observe all 80+ O stars in the Carina nebula using the new VLT 2nd-generation extreme-AO instrument SPHERE. This instrument offers unprecedented imaging contrast allowing us to detect the faintest companions around massive stars. These novel observational constraints will help to discriminate between the different formation scenarios. Using a state-of-the-art code named VIP, we are able to analyse these faint companions and obtain crucial information in order to characterise them. Here, we present the first results of the ongoing observational campaign.

Keywords: binaries, binary detection, observational astronomy, interferometry, massive stars, extreme adaptive optics, optical astronomy

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