Infrared insights into complex B[e] stellar environments unveiled by VLTI/MATISSE

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Abstract

B[e] stars are massive, hot B-spectral type stars embedded within a dense dust circumstellar envelope. As a result, their continuous spectrum shows a strong infrared excess, forbidden and permitted optical emission lines [1]. Because they constitute a vast and heterogeneous class of objects in terms of stellar evolution (i.e. from Herbigs Ae/Be stars to supergiants, most of them unclassified) [2], B[e] stars are still not very well understood despite a long history of observations [3]. For instance, recent observations indicate that supergiants showing B[e] characteristics can host circumstellar rings [4]. So far, the main scenarios to explain the detection of a large amount of gas and dust, geometrically distributed in discs around the latter, are either due to decretion mechanisms, driven by radiative pressure, rotation, pulsation or mass transfer due to binary interaction [5, 6]. As the structure and dynamics of these discs are still unclear, the analysis of our VLTI/MATISSE observation campaign conducted over 17 B[e] stars improves the general understanding over the mechanisms that drive phases of enhanced mass loss and mass ejections, responsible for the shaping of the circumstellar material of B[e] stars. The focus of this presentation will lie on early geometric modelling and image reconstruction results of the B[e] stars from our VLTI/MATISSE survey and will also touch on potential implications with regard to previous results obtained with the first generation interferometric instrument VLTI/MIDI.

Keywords: stars: individual: HD 62623 – stars: emission-line, massive – infrared: stars – Be: circumstellar matter – techniques: high angular resolution, interferometry – methods: data analysis

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