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DISK TRACING FOR B[E] SUPERGIANTS IN THE MAGELLANIC CLOUDS

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Abstract. B[e] supergiants are evolved massive stars with a complex circumstellar environment. A number of important emission features probe the structure and the kinematics of the circumstellar material. In our survey of Magellanic Cloud B[e] supergiants we focus on the [OI] and [CaII] emission lines, which we identified in four more objects.

1 Introduction

The B[e] supergiants (B[e]SGs) are an important short-lived transition phase in the life of some massive stars, in which enhanced mass-loss leads to a complex circumstellar environment containing atomic, molecular and dusty regions of different temperatures and densities, presumably confined within a dense disk. Fortunately, a set of forbidden and permitted emission lines allow us to probe the properties and the kinematics of different regions in this disk. Recently, Aret et al. (2012) have identified that [CaII] $\lambda\lambda$7291, 7324 lines can be used as a complementary observational tracer for regions forming closer to the star than the [OI] $\lambda\lambda$6300, 6363 and 5577 lines (Kraus et al. 2007, 2010).

2 Observations and Discussion

We used FEROS (at 2.2m MPG/ESO, La Silla-Chile), during 2 observing runs (24/Nov. – 4/Dec., 2014 & 10 – 18/May, 2015) to obtain high-resolution (R$\sim$48000) and wide-ranged ($\sim$3600-9200 Å) spectra for 12 Magellanic Cloud B[e]SGs.

The left panel of Fig. 1 shows selected lines of different tracers for LHA115-S6 in the SMC (new identifications in the LMC include: LHA120-S35, LHA120-S124, and ARDB 54). In all sources we identified a broad Hα line, and emission from the CaII $\lambda\lambda$8498, 8542, 8662 triplet, a composite of wind and disk-like regions. The

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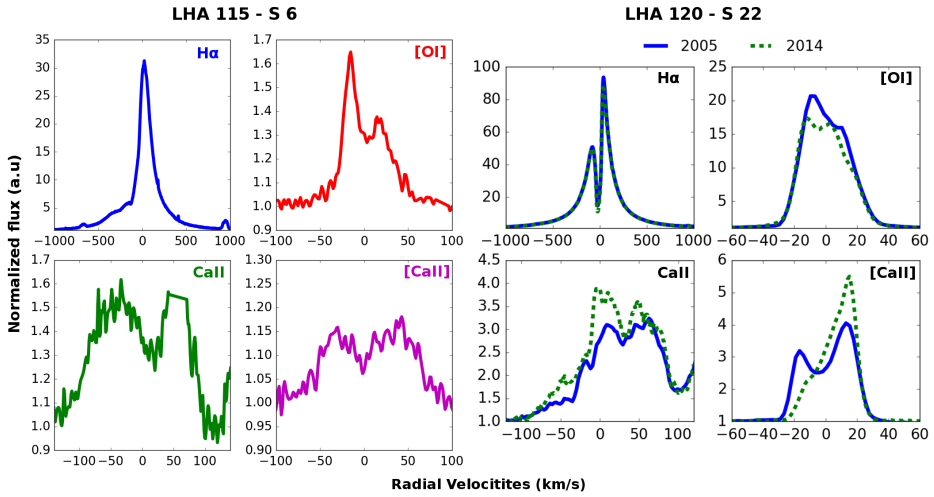

Fig. 1. Selected disk tracers detected in LHA115-S6 (left panel) and time variability in strategic lines of LHA120-S22 (right panel).

[OI] $\lambda\lambda$6300, 6363 and 5577 lines are present in almost all sources, being either single-peaked or asymmetric. The [CaII] $\lambda\lambda$7291, 7323 doublet is rather faint in our stars, but display double-peaked profiles, indicative of rotationally-disk structures.

We examined time variability of these lines, using data from 2005 (Aret et al. 2012) and our own. For most sources we do not find any significant changes with respect to their spectral-line profiles and intensities. However, LHA120-S22 and LHA115-S18 show considerable changes in their line profiles. The right panel of Fig. 1 depicts the variability of LHA120-S22 indicating a highly dynamical circumstellar environment, with the characteristic transition of the [CaII] λ7291 line from double-peaked (2005) towards single-peaked (2014).

With this work we identified the [CaII] disk tracers in 4 additional B[e]SGs in the Magellanic Clouds (almost doubling the number of studied B[e]SGs). By modeling their line profiles we can investigate the kinematics of their formation regions. Moreover, spectra at different epochs allow us to track the evolution of the circumstellar environment of B[e]SGs and possible changes in their mass-loss behavior.

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