Massive Stars Near and Far
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An infrared view of NGC3603

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Abstract. NGC3603 is one of the youngest massive clusters of the Milky Way which uniquely enables studying the interplay between massive star feedback and the surrounding interstellar medium. Yet, a deep infrared (IR) view of the cluster is missing. We present guaranteed time observations of NGC3603 consisting of near infrared spectroscopy taken with VLT-KMOS. This data set will provide a first, rather complete IR census.

Keywords. stars: early-type, galaxies: star clusters, open clusters and associations: individual (NGC3603)

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1. Observations and data reduction

NGC3603 is considered the Galactic counterpart to NGC2070 core (R136), around 2.5 times smaller in massive star content (Drew et al. 2019). Due to its proximity in the Carina nebula (Kalari et al. 2019), this cluster is an ideal test bed for starbursts studies and may be used as a proxy to understand this phenomenon in more distant galaxies where the stellar content is impossible to resolve. The program consisted of observations of the cluster with VLT-KMOS multi IFU infrared spectrograph. Target selection was based on previous spectroscopic and photometric identifications of the massive star population in NGC3603 (Moffat 1983; Melnick et al. 1989; Melena et al. 2008; Roman-Lopes et al. 2016). The magnitudes of the stars included in this study range from bright stars having a 9th magnitude in the J band to the weakest stars having magnitudes up to 12th (Harayama et al. 2008).

To perform the most effective telluric correction, two methodologies have been tested using molecfit (Smette et al. 2015) to obtain a model of the atmospheric conditions. On the one hand, molecfit has been run over A0 telluric standard star spectra observed subsequently to the science objects. On the other hand, molecfit has been executed over the science stars itself. The telluric correction resulting from the two different methodologies is shown in Fig. 1 using two different science stars as examples. We find that the most

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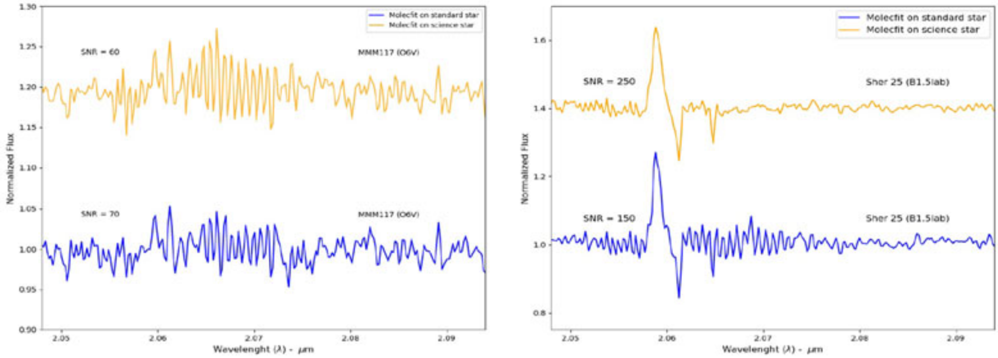

Figure 1. Telluric spectra of stars MMM117 (S/N = 70, **left**) and Sher25 (S/N = 250, **right**) using molecfic on standard (**bottom**) and molecfit on source (**top**) methods.

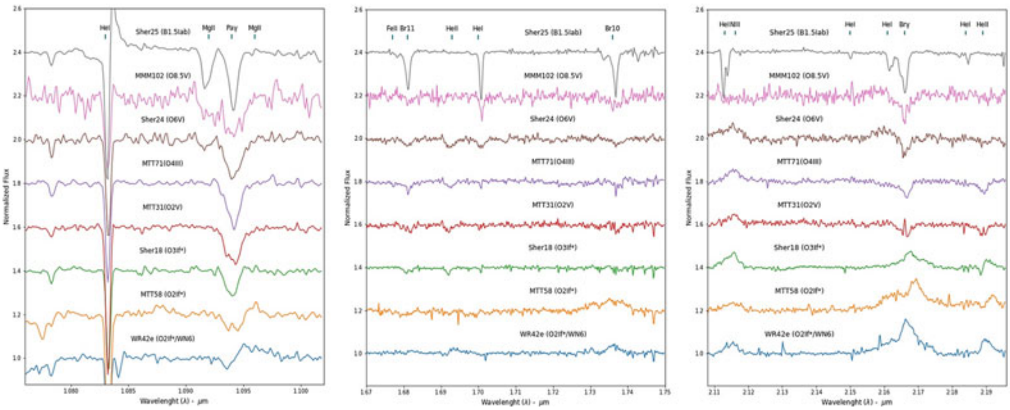

Figure 2. Reduced spectra of a selection of stars in the J, H, and K bands.

accurate results are achieved when molecfit is applied directly to the science objects, unless the observed spectrum of the standard star exhibits a signal to noise ratio (S/N) at least a factor 2.5 higher than the science star spectrum.

2. Preliminary results

As a result of this work, we have obtained an infrared census of 40 stars in the cluster. We have spectra in the J, H, and K bands for 34 of them, while for the remaining 6 we only have spectra in the K band. This census includes O-type stars, and a B supergiant star previously identified(Moffat 1983; Melena et al. 2008; Roman-Lopes et al. 2016). Some of these spectra are shown in Fig. 2. The sample will be analyzed with CMFGEN (Hillier & Miller 1998) model atmospheres to derive stellar and cluster properties.

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