Red supergiant stars in NGC 4449, NGC 5055, and NGC 5457

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Abstract. Nearby galaxies are ideal objects for the study of the mechanisms of galaxy formation and evolution, and massive stars in nearby galaxies are useful sources to investigate the structures and formation of the galaxies. It is important to gather the contents of massive stars for a number of galaxies spanning various metallicities. We focus on the red supergiants (RSGs) in nearby galaxies NGC 4449, NGC 5055, and NGC 5457, and the photometric properties of RSGs of three galaxies were investigated using near-infrared (JHK) imaging data obtained from WFCAM UKIRT. The $(J-K,K)_0$ CMDs are investigated and compared with theoretical isochrones (Figure 1). The majority of RSGs in three galaxies have common age ranges from $\log(t_{yr}) = 6.9$ to $\log(t_{yr}) = 7.3$, and this indicates that these galaxies have experienced recent star formation within 20 Myr. Spatial correlation of RSGs with H II regions and their colour distribution were also investigated. For NGC 4449 and NGC 5457, the RSGs are spatially correlated with the H II regions, which however is not the case for NGC 5055. We found a similar colour distribution and a constant peak magnitude of $M_K = -11.9$ for the RSGs in the three galaxies.

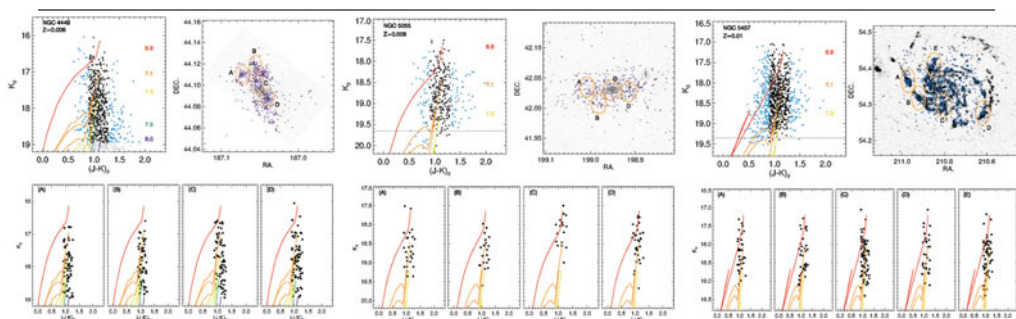**Keywords.** (stars:) supergiants, Galaxy: stellar content, infrared: stars.

Figure 1. Top-left panels : $(J-K,K)_0$ CMDs of RSGs in the galaxies. The isochrones of PARSEC (Bressan *et al.* 2012) with several ages are plotted with different colours. Black and blue dots are the genuine and possible RSGs, respectively. The ages of $\log(t_{yr})$ are indicated in the panels. Top-right panels: sky distributions on $H\alpha$ images. The dominant HII regions were selected as circles. Bottom panels: $(J-K,K)_0$ CMDs of RSGs in selected HII regions for three galaxies. The label in each panel corresponds to the selected H II region. The theoretical isochrones are the same as those of top-left panel.

Reference

Bressan, A., Marigo, P., Girardi, L., Salasnich, B., Dal Cero, C., Rubele, S., & Nanni A. 2012, *MNRAS*, 427, 127