

Peculiar radial velocities and action values of red supergiant stars in RSGC4

Young massive clusters are excellent laboratories to study the star formation process and structures of galaxies as well as massive stellar evolution. Six red supergiant clusters (RSGCs) recently found in the Scutum-Crux arm can provide insights into starburst history and chemical enrichment in the region. We report that RSGs in RSGC4 (Alicante 8) show peculiar radial velocities and action values. Combining the radial velocities measured from high resolution ($R \sim 45,000$) near-infrared spectra of IGRINS and Gaia proper motion, we find that RSGs in RSGC4 do not exhibit disk-like motion, unlike the other clusters. We additionally find that RSGs in RSGC1 show significant vertical motion characterized by large inclinations and eccentricities. From photometry, action values, and spectroscopy data, we carefully raise the possibility that RSGC4 is not a genuine star cluster but rather a composite of stars (RSG and AGB) along the line of sight.