

The Massive Stellar Population of W49: A Spectroscopic Survey

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Massive stars form on different scales ranging from large, dispersed OB associations to compact, dense starburst clusters. The complex structure of regions of massive star formation, and the involved short timescales provide a challenge for our understanding of their birth and early evolution. As one of the most massive and luminous star-forming region in our Galaxy, W49 is the ideal place to study the formation of the most massive stars. By classifying the massive young stars deeply embedded into the molecular cloud of W49, we aim to investigate and trace the star formation history of this region. We analyse near-infrared K -band spectroscopic observations of W49 from LBT/LUCI combined with JHK images obtained with NTT/SOFI and LBT/LUCI. Based on JHK -band photometry and K -band spectroscopy the massive stars are placed in a Hertzsprung Russell diagram. By comparison with evolutionary models, their age and hence the star formation history of W49 can be investigated. Fourteen O type stars as well as two young stellar objects (YSOs) are identified by our spectroscopic survey. Eleven O-stars are main sequence stars with subtypes ranging from O3 to O9.5, with masses ranging from $\sim 20 M_{\odot}$ to $\sim 120 M_{\odot}$. Three of the O-stars show strong wind features, and are considered to be Of-type supergiants with masses beyond $100 M_{\odot}$. The two YSOs show CO emission, indicative for the presence of circumstellar disks in the central region of the massive cluster. The age of the cluster is estimated as ~ 1.5 Myr, with star formation still ongoing in different parts of the region. The ionising photons from the central massive stars have not yet cleared the molecular cocoon surrounding the cluster. W49 is comparable to extragalactic star-forming regions and provides us with an unique possibility to study a starburst in detail.

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