

Galactic Center lobe

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Abstract

The Galactic Center lobe (GCL) is a degree-tall shell seen in radio continuum images of the Galactic center (GC) region. People can study the ionized gas to know the feature of GCL. An useful tools for detecting the physics conditions of the ISM is radio recombination lines. So they conducted new radio recombination line observations and collected archived observations to study the nature of the emission in GCL. They used the HCRO 26m telescope to map the H109 α recombination line toward the GCL in 1985. The spectrometer at HCRO was tuned to a central frequency of 5008.923MHz, 512 channels, and a 20MHz bandwith, which covered the H109 α and H137 β transitions. They also used GBT observations to do more detailed research. The spectrometer was configured with four windows of width 200 MHz observing eight H α and He α transitions from $n = 106$ to 113. Their observations find that the radio line emission has a morphology strikingly similar to the radio continuum. The GBT observations find the recombination line emission is in local thermodynamic equilibrium. The emission is not stimulated and line widths are narrow, and they constrained the temperature to be less than 4000K. The best-fit model to the line widths gives $n_e = 910^{+310}_{-450}\text{cm}^{-3}$. All the results show GCL maybe a radio continuum shell and is the evidence of a mass outflow from the GC region.