

SPECTRAL LINE PROFILES AND MOLECULAR COMPLEXITY IN HOT CORES AROUND RCW 120

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Studying regions of massive star formation is a challenging problem due to their rarity and distance from observers. It is noteworthy that many complex organic molecules were first detected towards hot cores and hot corinos.

According to Herschel data, around 25 % of massive young stellar objects (MYSOs) are located in neutral envelopes of HII regions. The border of the expanding HII region RCW 120 contains several MYSOs, which represent the early stage of the hot core development. The simple morphology and relatively close distance from the Solar System (1.34 kpc) make this region suitable for observations with single-dish telescopes. However, to our knowledge, no attempts have been made to study molecular line emission towards the hot cores in the region.

Using the APEX telescope, we performed a spectral survey towards dense hot molecular cores in RCW 120. Our observations covered a broad range of frequencies, from 200 to 260 GHz. We detected 43 molecular line emissions, including isotopologues and deuterated species, towards the most massive hot core in the region. We reached a noise level of 14 mK, allowing us to investigate the profiles of molecular line emissions and thus to study kinematics in the vicinity of hot cores using molecular line emission of species such as SiO and CH₃OH, which are typically used to detect outflows. We also used position-velocity diagrams to study kinematics around the HII region. To determine physical conditions around MYSOs, we applied the rotational diagram method to different observed transitions of the CH₃CCH molecule.