

Interferometric Observations of Formaldehyde in the Protoplanetary Disk around LkCa15

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<http://nova.scitec.kobe-u.ac.jp/members/aikawa-j.html>

Emission from the $2_{12}-1_{11}$ line of H₂CO has been detected and marginally resolved toward LkCa15 by the Nobeyama Millimeter Array. Disk radius is about 650 AU, and the H₂CO column density is estimated to be 7.2×10^{12} - 1.9×10^{13} cm⁻². The column density of H₂CO is higher than that observed in DM Tau disk and than predicted by theoretical models of disk chemistry. Similar behavior has been observed in other organic gaseous molecules in the LkCa15 disk. The different molecular column densities in these two objects could be caused by different physical conditions in the disks such as grain size and/or intensity of X-rays from the central star. The line intensity profile of H₂CO is less centrally peaked than that of CO, which would be caused by higher sublimation temperature of H₂CO and thus depletion onto grains at inner radius than for CO.

With ALMA we can detect less abundant species and observe molecular lines in disks with much higher spatial resolution; i.e. a few AU at the Taurus molecular cloud. Such observations are very important to reveal both chemical and physical evolution of protoplanetary disks.