

P115a A Chemical View of Protostellar-Disk Formation in L1527

Sakai, N., Oya, Y., Sakai, T., Watanabe, Y., Yamamoto, S.(Univ. Tokyo), Hirota, T., Aikawa, Y. (Kobe Univ.), Ohashi, N. (NAOJ), Takakuwa, S., Yen, H-W. (ASIAA), Ceccarelli, C. (IPAG), and IPAG groupe members(France)

Sub-arcsecond images of the rotational line emissions of CCH, CS, H₂CO, and CH₃OH have been obtained toward the low-mass protostar IRAS 04368+2557 in L1527 as one of the early science projects of the Atacama Large Millimeter/submillimeter Array. The intensity distributions of CCH and CS show a double-peaked structure along the edge-on envelope with a dip toward the protostar position, whereas those of H₂CO and CH₃OH are centrally peaked. By analyzing the position velocity-diagrams along the envelope, CCH and CS are found to reside mainly in the envelope, where the gas is infalling with conservation of its angular momentum. They are almost absent inward of the centrifugal barrier. Although H₂CO exists in the infalling rotating envelope, it also resides in the disk component inside the centrifugal barrier to some extent. On the other hand, CH₃OH seems to exist mainly in the ring and disk component. Hence, the drastic chemical change occurs at the centrifugal barrier. A discontinuous infalling motion as well as the gas-grain interaction would be responsible for the chemical change. This result will put an important constraint on initial chemical compositions for chemical evolution of protostellar disks.