

P138a Resolving Envelope to Disk Transition around the Class 0 Protostar, IRAS04368+2557

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We have resolved for the first time radial and vertical structures of the almost edge-on envelope/disk system of the low-mass Class 0 protostar L1527 at a resolution of $0.1'' - 0.3''$ (15 – 30 au) for 0.8 mm band with ALMA. While a thin infalling-rotating envelope (~ 50 au) is seen in the CCH emission outward of about 150 au, its thickness is increased by a factor of 2 inward of it, as reported in the ASJ meeting 2016 fall (P122a). The transition is located between the centrifugal radius (200 au) and the centrifugal barrier (100 au) of the infalling-rotating envelope. It seems that the gas is stagnated in front of the centrifugal barrier and moving along the direction vertical to the mid-plane. The SO emission is concentrated around and inside the centrifugal barrier. The rotation motion of the gas containing SO is found to be decelerated around the centrifugal barrier. A part of the angular momentum could be extracted by the gas moving away from the mid-plane around the centrifugal barrier. If it is the case, the centrifugal barrier may be related to launching mechanisms of disk winds or outflows. According to our new analysis, H_2CO emissions traces a part of the inner disk as well as the envelope while CS emission does the outflow in addition to the envelope. By using all these results, we will discuss a possible mechanism of the angular momentum loss around the centrifugal barrier.