

P138a **Spiraling giants: witnessing the birth of a massive binary star**

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Most massive stars are thought to form with companions. However, so far essentially all information about the properties of massive binaries come from observations of already formed stars, whose orbital properties may have evolved or changed since birth. Little is known about what massive binaries are like when they are still forming from their parent clouds. We report ALMA observations of 1.3 mm continuum and H30 α hydrogen recombination line (HRL) with a spatial resolution of 0.03 arcsec. The observation reveals a massive protobinary system with an apparent separation of 180 au towards the massive star-forming region IRAS07299-1651. From the line-of-sight velocity difference of 9.5 km/s of the two protostars measured from the H30 α lines, the binary is estimated to have a minimum total mass of 18 Msun, which is consistent with several other metrics including total luminosity, ionizing photon rate, as well as gas dynamics. This is the first time that motions of embedded, forming massive binary can be detected and used to constrain the dynamics of a massive binary at birth. The H30 α line from the primary traces a rotating ring of radius of 12 au. The extended dust and molecular gas emissions also show that gas streams on a scale of 1,000 to 10,000 au are infalling with rotation to feed the binary system. The observations indicate that disk fragmentation at several hundred au may have formed the binary, and much smaller disks are feeding the individual protostars.