[P04-5] Occurrence Frequency of CO Outflows in Massive Protostellar Candidates

Kee-Tae Kim[1], Stan E. Kurtz[2]
[1]*University of Illinois/KASI,* [2]*Universidad Nacional Autónomade México (UNAM)*

We mapped 12 massive protostellar candidates in the CO J=2-1 line, which in combination with Zhang et al. (2005) completes an unbiased survey of outflows for all 48 sources with l>50o in a sample of 101 massive protostellar candidates. We detected outflows in 10 sources, implying 88% occurrence frequency of outflows for the 48 sources. This strongly suggests that bipolar outflows are an integral component in the formation process of massive stars. The vast majority of the observed outflows are much more massive (>10 M$\odot$) and energetic (>100 M$\odot$ km s^{-1}) than outflows from low-mass protostars. They also have large mass outflow rates (>2x10^{-4} M$\odot$ yr^{-1}), indicating large (~1x10^{-4} M$\odot$ yr^{-1}) accretion rates sufficient to overcome radiation pressure of the central massive protostars. We compared the frequency distribution of collimation factors of 40 massive outflows including those of this study with that of 36 low-mass outflows from the literature, and found no significant difference between the two. All these results are consistent with the suggestion that massive stars form through accretion as do low-mass stars but with much higher accretion rates.

[P04-6] A Survey of Molecular Outflows in the Orion A Molecular Cloud

Geumsook Park[1,2] and Minho Choi[2]
[1]*Department of Astronomy & Space Science, Chungnam National University, Daejeon 305-764, Korea*
[2]*International Center for Astrophysics, Korea Astronomy and Space Science Institute, Hwaam 61-1, Yuseong, Daejeon 305-348*

The near-IR H_2 emission features in the northern region of the Orion A giant molecular cloud were observed in the CO J=1-0 line using the 14 m telescope of Taeduk Radio Astronomy Observatory. Out of the 30 positions surveyed, CO line wings were detected toward 28 positions, suggesting a strong correlation between H_2 jets and CO outflows. Blue wings were detected toward 26 positions while red wings were detected toward 15 positions, which suggests that there is a bias in the source selection.