

Massive Star Formation

Karl M. Menten (Max-Planck-Institut für Radioastronomie, Bonn)

Massive stars strongly shape the molecular clouds in which they form. This is most obvious where the embedded stars begin ionizing their environment, producing ultracompact HII regions. However, interactions of the stars with the surrounding medium may even start at earlier phases of (proto)stellar development in the form of energetic outflows, which have been observed in a number of regions. Little is known about the mechanisms driving these outflows. In fact, our knowledge of the earliest stages of massive star formation is very incomplete in general. Moreover, only a few bona fide high mass protostars have been found so far. The large distances of high-mass star-forming regions call for interferometric measurements and over the past 15 years interferometers working at centimeter and millimeter wavelengths have provided a great wealth of information. However, further progress requires brightness sensitivities and spatial resolutions not available with current instruments. ALMA will allow studies of the chemistry, energetics, and kinematics of the dense circumstellar envelopes surrounding deeply embedded protostars with unprecedented angular resolution and sensitivity and revolutionize our understanding of massive star formation.

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