

# Methanol masers and massive star formation

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**Abstract.** It has been established that massive stars form in dense clusters, when large molecular clouds collapse. However, the high obscuration and small spatial scales make it difficult to investigate the earliest stage of high-mass protostellar objects (HMPOs). Therefore methanol masers are of special interests as they are closely associated with HMPOs and offer high spatial resolution; they probe the massive star formation environment at the unique scale of a few AU (1 mas corresponds to 5 AU at 5 kpc).

We present VLBI observations of methanol masers discovered in an unbiased survey along the Galactic plane. We compare their positions with infrared surveys. In general, the masers do not coincide with infrared objects. That implies they are already present at a very early evolution stage of HMPOs when the dense surroundings still absorb other radiation. In addition we present maps of five methanol masers towards HMPOs with milliarcsecond resolution taken with the recently extended European VLBI Network. These sources show a wide variety of morphologies, indicating they arise in different events going on in close surroundings of HMPOs, i.e. outflows, discs or shocks. One source G23.657–00.127 displays a regularly shaped ring which appears as a great laboratory for further research of a single HMPO. Proper motion studies should reveal an expansion or rotation of the maser components in 2–3 years.

**Keywords.** stars: formation, circumstellar matter; techniques: high angular resolution