

R03c High-resolution imaging of H₂O maser in the M 82 starburst

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High-resolution imaging observations of 22 GHz H₂O maser in the starburst galaxy M 82 (NGC 3034) were conducted at ~ 0.02 arcsecond angular resolution using MERLIN (Multi-Element Radio-Linked Interferometer Network). The galaxy hosts low-luminosity H₂O maser sources, four of them have been detected by Very Large Array (VLA). We aimed for imaging the known maser of S2, which remains unresolved by earlier VLA observations at ~ 0.1 arcsecond resolution. In our observations, the maser has been barely resolved into two clusters with an angular separation of ~ 0.02 arcsecond, which corresponds to 0.35 pc at a distance to the galaxy of 3.5 Mpc. The position of the maser that has been measured at the highest resolution reveals that the maser is approximately associated with the inner edge of super-bubble structure probed by thermal molecular lines (Matsushita et al. 2005), while the velocity range of the molecular lines is not consistent with that of the maser. We found that the velocity of the maser overlaps that of a molecular outflow in molecular clouds (Weiss et al. 2001), where the maser is located. These results may suggest that the maser at S2 is originated from a star-forming site and appears in an early stage of star-formation in the starburst environment.