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TITLE: Water Masers in W49N

ABSTRACT BODY:

Abstract Body: Water masers have long been known to be one of the best signposts of active star formation and regions of extremely dense gas ($>10^8 \text{ cm}^{-3}$) and therefore tracing high-velocity outflows and shock fronts. W49N is one of the richest and most luminous water maser in our Galaxy. The variability of water masers in W49N has been studied since its discovery, showing short and long time scale variations. Short-time scale monitoring often shows dramatic variations in flux density, line width and line center velocity. However, the models accounted for such variations are still under debate. We report the study of the recent major outburst of the 22-GHz water maser in W49N in 2014. We carried out the simultaneous observations of several water transitions both at millimeter and submillimeter wavelengths with the Effelsberg 100-m radio telescope, the IRAM 30-m telescope, and the APEX 12-m submillimeter telescope. We have also performed interferometric observations of the 22-GHz transition using the NRAO Very Long Baseline Array (VLBA) and of the 321- and 325-GHz transitions using the Submillimeter Array (SMA). Studying these multiple masing transitions in conjunction with theoretical modeling of their excitation places strong constraints on the physical conditions of the masing gas and also allows us to probe the embedded environment.

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