P35a H_2O Maser Polarization structure in Orion-KL

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The interstellar H_2O maser is a good probe to study the environment of star-forming regions. Interferometric observations of H_2O masers provide information on the precise position, velocity, distribution of spots and kinematics in the protostellar environment. In low-mass star forming regions, H_2O masers are associated with pre-main-sequence stars. However, in high-mass star-forming region, it is still a puzzle because the kinematical and dynamical conditions are more complex. One the other hand there is a growing consensus that magnetic fields play a crucial role during star-formation and confinement of mass out flow from protostars. The observations of maser polarization provide information on the magnetic field direction in dense protostellar gas, which is difficult to obtain by other means. We have made VLBA (Very Large Baseline Array) polarization maps of the high-mass star-forming region Orion-KL, specifically of the region associated with SiO maser emission with surround IRc2. High resolution VLBA observations permit us to study: 1) the structure of the molecular torus and outflow through the distribution of both polarization degree and polarization angle, and 2) the relation between H_2O maser polarization and magnetic fields. Information on the field structure on the scale of 10^{12}-10^{15} cm enable us to compare directly various theories of protostar formation. The VLBA observations was made 1 February 1997 for 8 hours. In this paper we report our preliminary result from the reduction of the data. We have identified twenty maser spots, in the velocity range of -40km/s to 50km/s, and about half of them show strong degree of linear polarization of $20 \sim 50$ %. We further discuss the polarization structure of this region and its relation to the magnetic field and maser pumping mechanism.