Molecular Emission of

Comet 73P/Schwassmann-Wachmann 3

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Abstract

During the perihelion in May 2006, we used the Kitt Peak 12m (KP12M) and the Submillimeter Telescope (SMT) of the Arizona Radio Observatory to observe the periodic comet 73P/Schwassman-Wachmann 3 (both Components B and C) while at a distance ~0.08 AU from the Earth and ~1.0 AU from the Sun. The extreme proximity of comet 73P made it a perfect target for single-dish telescope. Cometary molecules HCN and CS were clearly detected through out the observing run across 10 days; however, *c*-C_3H_2 was only detected the first day. This is the first detection of *c*-C_3H_2, ever in any comet. Deuterated water, HDO, was also detected marginally thus the detection is tentative. The observed intensity variation of HCN J=3–2 line suggests we were looking into the very inner coma of the comet. The intensity ratios of the HCN J=1–0 hyperfine components indicate that the 1–0 HCN emission is optically thin.

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