# THE SUBMILLIMETER SPECTRUM OF THE GROUND TORSIONAL STATE OF $CH_2DOH$

JOHN C. PEARSON, CAROLYN S. BRAUER, SHANSHAN YU, and BRIAN J. DROUIN, *JET PROPULSION LABORATORY, CALIFORNIA INSTITUTE OF TECHNOLOGY, 4800 OAK GROVE DR., PASADENA, CA 91109*.

Methanol and its isotopologues are well known tracers of gas grain chemistry with deuteration of the methyl group being energetically favorable in very cold environments on grain surfaces. In order to study the early evolution of star forming cores, constrain grain chemistry, and to develop a methodology for addressing the completely asymmetric internal rotation problem, the spectrum of $CH_2DOH$ in its ground torsional state has been investigated to 1.6 THz. The study has facilitated the assignment of a complete ladder of highly interconnected energy levels in the $e_0$, $e_1$ and $o_1$ sub-states. The ground state spectrum of completely asymmetric $CH_2DOH$ with $C_S$ symmetry has been assigned to $J > 25$ and $K_a = 8, 9, 8$ in each substate, respectively. This $K-$range facilitates coverage of one full period of $\rho K$ and provides some valuable insight into the completely asymmetric internal rotation problem. The energy level structure also provide a unique opportunity for a direct comparison to normal methanol with its $C_{3V}$ internal rotation. The spectral features, analysis and energy level structure will be discussed and compared to that of normal methanol.