THE GROUND STATE ROTATIONAL SPECTRUM OF CH$_2$DOH

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The rotational spectrum of CH$_2$DOH has been the subject of a number of investigations into the asymmetric-top asymmetric-frame internal rotation problem. This work is the first complete investigation of the ground state spectrum and the first opportunity to address the asymmetric internal rotation problem in detail. The ground state spectrum is composed of three sub states e_0, e_1 and o_1 of the C$_S$ group. Transitions of a- and b-types are observed within each torsional sub state. Transition between each sub state are allowed with e to e transitions following a- and b-type selection rules and e to o transitions following c-type selection rules. Over 1000 transitions of all types have been observed and assigned in the spectrum to J>20 and K=5 between 4 to 600 GHz. The assignments of a significant number of the transitions have been confirmed with combination differences. An analysis of the data set, using an IAM type model based on the structure, fits the observed data to an accuracy of several times the experimental uncertainty. The model and a discussion of the asymmetric-top asymmetric-frame internal rotation problem will be given along with the derived constants.