OBSERVATION AND ANALYSIS OF THE $A_1$-$A_2$ SPLITTING OF CH$_3$D

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Sub-Doppler resolution spectroscopy of CH$_3$D has been carried out for the $v_1$ and $v_4$ fundamental bands using a comb-referenced difference-frequency generation spectrometer. Thirty transitions from the low-$J''$ and $K'' = 3$ levels are observed with a resolution of 60 to 100 kHz, and the $A_1$-$A_2$ splitting is resolved for twenty-three of the thirty transitions. Most of them are overlapped in Doppler broadening and resolved for the first time, as far as we know. The absolute transition frequencies are determined with a typical uncertainty of 4 kHz. The $A_1$-$A_2$ splitting constant of the $K'' = 3$ levels is yielded as $2h_{3_{v=0}} = (1.5641 \pm 0.0026)$ Hz for the ground vibrational state. Those of the $K' = 3$ levels for the $v_1 = 1$ states and of the ($K' = 2$, $l = -1$) and ($K' = 4$, $l = 1$) levels for the $v_4 = 1$ state are also determined including the $J'$-dependent terms.