THE $v_t = 3$ STATE OF METHANOL

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The rotational spectrum of methanol is characterized by an asymmetric top overall rotation coupled with an intermediate barrier three fold hindered rotation. The spectrum progresses from a torsionally modified asymmetric top in the $v_t = 0$ state to a rotationally modified torsion by the $v_t = 2$ state. The $v_t = 3$ state lies well above the torsional barrier and in close proximity to the CO stretch vibration. The $v_t = 3$ microwave spectrum has been assigned up to $J = 34$ in over 1 THz of frequency measured spectra. In spite of the success in assigning the a-type R-branches the b-type spectra is surprisingly weak suggesting that the torsion significantly modifies the intensities of the few K levels in close enough proximity to have transitions below 2.5 THz.