CORIOLIS-DEPENDENT DIPOLE MOMENT OF THE $V_3 = 2$ STATE OF METHANE

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Stark effect of the $2\nu_3$ band of methane was studied by saturation spectroscopy using an optical cavity absorption cell and a 1.6-μm external cavity semiconductor laser. The magnitude of the determined dipole moments was dependent on the Coriolis sublevels. This dependence agreed with the higher-order dipole moment [a],

$$\mu_\alpha \propto \ell_\beta J_\gamma + J_\beta \ell_\gamma$$

where μ is the dipole moment, ℓ are the vibrational angular momenta, J are the total angular momenta, and (α, β, γ) is (x, y, z), (y, z, x), or (z, x, y) components of the molecule-fixed axes.

[a] M. R. Aliev, V. M. Mikhailov, and J. K. G. Watson, J. Mol. Spectrosc. 118, 544 (1986).