LINE SHAPE PARAMETERS FOR WATER VAPOR TRANSITIONS IN THE 0.7 MICRON REGION

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Pressure-broadened halfwidths and pressure-induced line shifts for the two most important bands of water vapor in the 0.7 μm region are determined using the Complex Robert-Bonamy (CRB) formalism. The calculations are made with nitrogen and oxygen as the perturbing gas from which values for air as the perturbing gas are determined. The intermolecular potential is taken as a sum of electrostatic contributions, Lennard-Jones (6-12) atom-atom, and isotropic induction and dispersion components. The dynamics of the collision process are correct to second order in time. The calculated values are compared with measurement and very good agreement is observed for both halfwidths and line shifts. The temperature dependence of the halfwidth, which is necessary for reduction of remotely sensed data, is determined.