Contribution ID: **1275** Type: **Oral (Non-Student) / orale (non-étudiant)**

Self- and Hydrogen-Broadened Line Parameters of Carbon Monoxide in the First Overtone Band

Monday 13 June 2016 11:15 (15 minutes)

We have re-analyzed room-temperature spectra of first overtone band of CO and CO broadened by hydrogen. We have employed the Voigt, speed depended Voigt, Rautian, and Rautian with speed dependence line shape models and a multispectrum fit software [1].
The line mixing coefficients have been calculated using scaling laws. The CO line widths in CO-Hydrogen and CO-CO collisions were calculated using the classical impact theory [2] to determine the dipole absorption half-widths and exact 3D Hamilton equations to simulate molecular motion. We used Monte Carlo averaging over collision parameters and simple interaction potential (Tipping-Herman + electrostatic) [3-4] and assumed the molecules to be rigid rotors. The dependencies of CO half-widths on rotational quantum number J<24 are computed and compared with measured data at room temperature.

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Session Classification: M1-7 Atomic and Molecular Spectroscopy and Precision Measurements I (DAMOPC) / Spectroscopie atomique et moléculaire et mesures de précision I (DPAMPC)

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)