LINE SHAPE PARAMETERS FOR N_2O DILUTED IN N_2 MEASURED BY MID-INFRARED DUAL-COMB SPECTROSCOPY

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Nitrous oxide is an important trace gas natrually present in Earth's atmosphere but also results of human activities[1]. It has an important role in atmospheric chemistry and in radiative transfer. N_2O is a strong greenhouse gas with a global warming potential 300 times higher than carbon dioxide[2], and contributes to the depletion of stratospheric ozone[3]. The monitoring of its concentration requires accurate knowledge of N_2O spectroscopic parameters for line shape parameters can be a limiting factor of the precision of atmospheric spectrum analysis. In addition, a limited number of accurate experimental line shape parameters are needed to determine and validate intermolecular potentials used in the state-of-the-art models allowing the calculations of these parameters.

In this preliminary work, the measurements were performed using a mid-infrared high-resolution dual comb spectrometer that is based on quantum cascade lasers. It was shown that this spectrometer is well suited for line shape parameter studies[4]. The N_2O-N_2 spectra were recorded at room temperature in the 1300 cm^{-1} wavenumber region. The line shape parameters were determined by adjusting the Voigt and Speed-Dependent Voigt theoretical models on the experimental line profiles using a multi-spectrum fitting technique. The obtained results are discussed and compared to literature.

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