HIGH PRECISION LINE PARAMETERS OF N$_2$O NEAR 1.5$\mu$m BY CAVITY RING-DOWN SPECTROSCOPY

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Accurate parameters of the N$_2$O transitions in the 1.5$\mu$m region are needed for monitoring global N$_2$O concentration in the atmosphere. The strongest band in this region is the 0003-0000 band. In HITRAN database, some parameters of this band are given by calculation, others are given by experiments but they are obtained by the Voigt profile, which is now well known can lead to significant deviations. The ro-vibrational transitions of the 0003-0000 band with line intensities in the order of $10^{-24}$ to $10^{-23}\text{cm}^{-1}/(\text{molecule-cm}^{-2})$ have been recorded using a laser-locked cavity ring-down spectrometer with high sensitivity as well as high precision. The positions were determined with an uncertainty of sub-MHz. The line intensities and Nitrogen induced pressure broadening coefficients were also derived with accuracies better than 0.8% and 1%, respectively. Comparisons of the line parameters determined in this work with literature experimental values and those from HITRAN2016 database are given.