

Precise line-shape measurements of oxygen B-band transitions with absolute frequency reference

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We present high-resolution and high-sensitivity line-shape measurements of self- and foreign-broadened P-branch transitions of the oxygen B band occurring near 689 nm. Data were acquired using the optical frequency comb-assisted Pound-Drever-Hall-locked frequency-stabilized cavity ring-down spectrometer (OFC-assisted PDH-locked FS-CRDS) [1, 2]. In the line-shape analysis the line narrowing described by Dicke narrowing or the speed dependence of collisional broadening were taken into account. The multispectrum fitting technique was used to minimize correlation between line-shape parameters. The relation between the parameters describing Dicke narrowing with the use of the soft- and hard-collision models is discussed and verified experimentally in the self-broadened case in the low pressure regime (below 5 kPa). We report line positions with uncertainties of about 170 kHz, intensities and the collisional broadening coefficients with subpercent uncertainties [3]. We compare these results to data available in the literature.

The research is part of the program of the National Laboratory FAMO in Toruń, Poland, and is supported by the Polish National Science Centre Projects no. DEC-2011/01/B/ST2/00491 and UMO-2012/05/N/ST2/02717. The research is also supported by the Foundation for Polish Science TEAM and HOMING PLUS Projects co-financed by the EU European Regional Development Fund. A. Cygan is partially supported by the Foundation for Polish Science START Project.

References

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