

Collisional effects on the spectral shape and atmospheric remote sensing

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Atmospheric remote sensing is entirely based on spectroscopy, the physical and chemical properties of the atmospheres being derived from the interpretation of spectra. The analysis of the measured data, mostly done through the so-called "inversion" procedures, requires the knowledge of the intrinsic spectroscopic parameters of absorption lines (positions, intensities, spectral shapes). The collisions between the molecules have to be considered as their effects yield a modification of the line shape for most of the atmospheric physical conditions (pressure, temperature).

It is now well known that the widely-used Voigt profile does not well describe absorption line shapes of molecular gases. This is due to several collision effects which are neglected by the use of the Voigt profile such as the Dicke narrowing, the speed dependences of collisional parameters, collisional interferences between lines, non-Markovian collisions. A short review on the recent theoretical approaches, models and results on the topic of spectral shapes will be reviewed with examples of their effect on atmospheric spectra analysis.