

Spectral line shapes affected by collisions: theory and experiment

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The development of experimental techniques of the Doppler limited spectroscopy as well as the continues progress of spectral line shapes theory stimulated each other for decades. It is now well established that the analysis of accurate spectra affected by collisions requires to consider several issues. Beside the Doppler and collisional broadening and shifting, typically considered in terms of the Voigt profile, the other effects such as: speed dependence of collisional broadening and shifting, Dicke narrowing, correlation between velocity-changing and phase or state changing collisions, and finally the dispersions line asymmetry should be taken into account as well. New analytical line shape models as well as *ab initio* approaches to the spectral line shape calculations accompanied by increasing accuracy of spectroscopic techniques stimulate works on new generation spectroscopic databases, Doppler width thermometry, determination of Boltzmann constant, spectroscopic tests of fundamental theories in molecular systems, precise determination of greenhouse gasses in the Earth atmosphere.