TESTING LINESHAPE MODELS: MEASUREMENTS IN CO BROADENED BY He AND Ar

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We present measurements of the spectral profiles of many P and R branch lines in CO-He and CO-Ar mixtures, all at 301.5 K. The absorption profiles were measured using a difference frequency spectrometer with signal to noise ratios exceeding 2000:1 and a spectral resolution of 2MHz. The lineshapes are compared with several semi-classical models and in particular with models that include the speed dependence of both the translational motion and the relaxation of the optical coherence. While the parameters of several models may be adjusted to fit the experimental data within the noise, no single model is free of criticism. Several shortcomings of existing models are discussed.