ARGON-INDUCED PRESSURE BROADENING, SHIFTING AND NARROWING IN THE CN $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+$ (1-0) BAND

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Selected isolated rotational transitions in the 1-0 band of the red $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+$ system in CN have been recorded with transient frequency modulation spectroscopy as a function of argon pressure up to 0.2 atmospheres at room temperature. Line shapes were fit using Fourier transforms of a parameterized time correlation function, including Doppler and velocity-dependent collisional broadening, and collisional shifts. Deviations from Voigt line shapes can be equally well fit by modeling the narrowing with a speed-dependent collision model or with a velocity-changing collisional narrowing model. Pressure broadening coefficients were observed with little rotational state dependence, in the range of 0.070 - 0.075 cm^{-1} atm^{-1}. In contrast, a much stronger rotational state dependence is observed for both pressure-dependent blue shift coefficients and the narrowing parameters. No asymmetry in the pressure broadening was observed; any possible speed-dependence to the frequency shift was too small to be detected in these measurements.
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