LINE MIXING EFFECTS IN THE $\nu_2+\nu_3$ BAND OF METHANE.

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This study provides the first experimental measurements of line mixing via the off diagonal relaxation matrix element formalism in air-broadened methane spectra for any vibrational band and the first off diagonal relaxation matrix elements associated with line mixing for pure methane in the $\nu_2+\nu_3$ band of $^{13}$CH$_4$. A speed-dependent Voigt profile with line mixing is used with a multispectrum nonlinear least squares curve fitting technique. The off diagonal relaxation matrix element coefficients of eighteen pairs of $\nu_2+\nu_3$ transitions between 4410 and 4629 cm$^{-1}$ have been determined. The measured self-line mixing coefficients vary from 0.0019 to 0.0390 cm$^{-1}$ atm$^{-1}$ at 296 K, and for air line mixing coefficients vary between 0.0005 and 0.0205 cm$^{-1}$ atm$^{-1}$ at 296 K. The spectral data used in the analysis were recorded at a resolution of 0.01-cm$^{-1}$ using the McMath-Pierce Fourier transform spectrometer located at the National Solar Observatory on Kitt Peak, Arizona.