LINE SHAPES IN THE Q BRANCH OF THE ν_4 BAND OF METHANE

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The Tropospheric Emission Spectrometer on the Earth Observing System Aura satellite measures methane in the Earth's atmosphere. Some of the methane channels are located in the Q branch of the ν_4 band of methane at 1300 cm^{-1}. Using laboratory spectra obtained with the National Solar Observatory's Fourier transform spectrometer at the McMath-Pierce solar telescope, this Q branch was examined for line mixing and speed dependent line shapes for both self-broadening and air-broadening. The analysis also determined line widths, pressure-induced shifts and line mixing as functions of temperature. Comparisons are made to demonstrate the importance of considering line shape effects in satellite measurements of the Earth's atmosphere.[a]

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