MEASUREMENT AND MODELING OF COLD $^{13}CH_4$ SPECTRA FROM 2.1 TO 2.7 μm

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A new study of $^{13}CH_4$line positions and intensities in the Octad region between 3600 and 4800 cm^{-1}will be reported. Nine spectra were recorded with two Fourier transform spectrometers (the McMath-Pierce FTS at Kitt Peak Observatory and the Bruker 125 HR FTS at the Jet Propulsion Laboratory) using ^{13}C-enriched samples at temperatures from 299 K to 80 K. Line positions and intensities were retrieved by non-linear least squares curve-fitting procedures and analyzed using the effective Hamiltonian and the effective Dipole moment expressed in terms of irreducible tensor operators adapted to spherical top molecules. Quantum assignments were found for all the 24 sub-vibrational states of the Octad (some as high as J=10). Over 4750 experimental line positions and 3300 line intensities were fitted with RMS standard deviations of 0.004 $cm^{-1}$and 6.9%, respectively. A new linelist of over 9600 measured positions and intensities from 3607 to 4735 $cm^{-1}$was produced, with known quantum assignments given for 45% of the features.[a]

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