ABSORPTION SPECTRA FOR THE 889 nm BAND OF METHANE DERIVED FROM INTRACAVITY LASER SPECTROSCOPY MEASUREMENTS MADE AS A FUNCTION OF LOW SAMPLE TEMPERATURES

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Methane is an important component in the atmospheres of the Giant planets and laboratory spectral data at low temperatures are required to interpret properly the planetary data. Methane absorption spectra are acquired using an intracavity laser technique using a cryogenically-operable absorption cell. This cell consists of four concentric cylindrical compartments (a vacuum envelope, a cryogenic compartment cooled by a flow of cold nitrogen gas, a helium-gas chamber, and the central methane chamber). Experiments designed to determine the effective temperatures achieved in the cell for various operating parameters will be described. The 760 nm atmospheric A band of molecular oxygen was used as reference in these experiments. Absorption spectra of methane in the 889 nm band have been recorded with this cell using the intracavity laser spectroscopy technique and averaged methane absorption coefficients are derived from these measurements, following deconvolution of the spectra for the instrument function.
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