Two Micron Absorption Features of Hydrogen Dimers in the Equatorial Spectra of Jupiter.

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A comparison between high resolution 2.10 - 2.13 μm equatorial spectra of Jupiter and a laboratory spectrum of the H_2 dimer reveals a significant coincidence in the positions of the stronger absorption features. A search for other known molecular absorption lines, such as those from CH_4, NH_3, and other minor constituent molecules proved negative. We conclude that the Jovian lines are due to the H_2 dimer. There is no indication of the rare transient emissions previously seen near the fundamental-band H_2 quadrapole lines that were reported by Trafton and Watson. Using thermodynamic methods, we derive the H_2 dimer mole factions as a function of altitude.

High Resolution Spectra of Jupiter's Auroral UV emission with the Hubble Space Telescope

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We have obtained 18 spectra of Jupiter's auroral UV emission in the wavelength range of 1586-1620 Å with the GHRS onboard the Hubble Space Telescope in June and July of 1993. The observations were made with the Large Science Aperture toward 14 and 4 areas of northern and southern auroral ovals, respectively. The spectra are dominated by electron-vibration-rotational lines of H_2 Lyman band system, from which we determine rotational temperatures of H_2 at altitudes where the auroral emission originates most. The derived rotational temperatures of H_2 from the spectrum we range of 400-850 K. By scaling a model spectrum to the observed flux spectrum we determine total emission rate of Lyman band system, which spans 25 to 250 kR over the different areas of the auroral regions. Two brightest UV emissions with emission rates of about 250 kR were observed toward longitude = 155° - 165° and latitude =50° - 65° when CML was near 190°. This location is consistent