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

with a position of a bright spot shown in the FOC image of Jupiter's northern aurora by Caldwell et al. (1992). Among the 18 auroral areas, there seems to be an anti-correlation between the rotational temperatures and the total emission rates, implying that characteristic energy of precipitating electrons increases with precipitating energy flux.

태양 정온 홍염의
Hα선과 Ca II H&K선 관측 연구

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1992년 8월 16일에 발생한 울타리형 정온 홍염에 대하여 Norikura Corona 관측소의 25 cm 코로나 그래프를 이용하여 CCD 분광 관측을 수행하였다. 관측한 분광선은 Hα 선과 Ca II H, K 선이며 각 분광선의 분광 분해능은 각각 0.025 A/pixel, 0.023 A/pixel, 0.023 A/pixel 이었다. 홍염 내부의 광학적 깊이가 얕고 LTE임을 가정하고 온도, 전자밀도, 비열적 속도 성분등 항성 대기의 기본 물리량의 수평, 수직 분포를 살펴보았다. 홍염 내부의 평균 물리량은 T = 8.000 K, $n_e = 10^{10.38}$ /cm 그리고 V_ξ km/s 로서 Hirayama(1989) 가 발표한 정온 홍염의 평균 물리량과 잘 일치하고 있으나 홍염 내부에서 보여주는 물리량들의 변화 폭은 기대 이상으로 높게 나타나고 있음을 볼 수 있다.

Dynamical Characteristics of Umbral Chromospheres

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Dynamical behaviors of umbral chromospheres are studied by analyzing the spectral fluctuations of CaII H and K lines of a sunspot umbra. These spectra were taken simultaneously with a time interval of 30 sec. for 20 min. by Echelle spectrograph of Sacramento Peak Solar Observatory, during which time the slit was kept fixed. The individual photographic spectrogram have been scanned by PDS of Korea Astronomy Observatory to convert the photographic density to the relative intensity.

In order to investigate the dynamical characteristics of the umbral chromospheres we set up time sequences of a few important physical quantities subject to dynamics, such as peak intensities of H and K line cores, their Doppler shifts and turbulent velocities valuated at 35 locations across the spot. With these quantities we made correlation studies and Fourier analyses. The main results are the following:

(1) 3 min. oscillatory behaviors of umbral chromospheres have been confirmed at all of the selected 35 locations of the sunspot umbra. Both of the power spectra made out of Doppler shifts of CaII H and K line cores and their peak intensity fluctuations reveal a distinct dominant peak at about 5.5 mHz.

(2) The Doppler shifts of H and K lines are highly correlated with their peak intensity fluctuations. The peak-to-peak Doppler shift often reaches as large as 6 km/sec, which is indicative of nonlinear behavior of the oscillations.

(3) The turbulent broadenings of the H and K line cores are tightly correlated with their peak