speculation that high energy cosmic rays could initiate ion chemistry, consuming these neutral light hydrocarbon species and converting them into heavier ionic polymer chains. The following model demonstrates how such a vapor sink effects the ethane mixing ratio and ethane ice haze on Uranus.

A one-dimensional, time-dependent model that solves the continuity equations for ethane mixing ratio and ice particle density in the lower stratosphere/upper troposphere of Uranus will be described. Ethane is the species selected for this first study because it accounts for a significant part of the total ice production rate on Uranus. The model couples eddy diffusion, cloud microphysics and a vapor sink between the 2.6 mb and 9.06 bar pressure levels. The vapor sink is a Gaussian function whose parameters are varied to simulate different scenarios whereby ethane vapor may be lost by conversion to other species through pyrolysis and/or cosmic ray ionization. Results will be presented.

06.12-P

An Expanded Program of Laboratory Measurements on Ammonia's Microwave Absorption Spectrum

T.R. Spilker (JPL)

A laboratory program to measure the microwave absorption spectrum of ammonia, under conditions applicable to giant planet atmospheres, has been initiated at JPL. This new program will improve the accuracy and extend the range of parameters provided by a previous measurement program at Stanford [Spilker, 1990].

The measurements are carried out using a dual cavity resonator microwave spectrometer to provide simultaneous measurements of refractivities and absorptivities over a wide range of frequencies (~2-30 GHz, or 1-15 cm), temperatures, and pressures. Gas mixtures to be studied include ammonia in otherwise pure hydrogen, ammonia in helium, and ammonia in a Jovian mixture of hydrogen and helium. To address temperature dependence questions, experiments will be conducted at temperatures of 173, 213, 273, and possibly 323 K. For each temperature, spectra will be will be acquired at total pressures of 0.5 to 2.0 atm in quarter-atm steps, and 2.5, 3, 4, 6, 8, and possibly 10 atm. Accuracies of the absorptivity measurements are expected to be about 0.2-0.5 dB/km, depending on frequency and the magnitude of the measured absorptivity values. This paper will describe the laboratory instrument and present results obtained to date.

These data will address questions of line broadening behavior in the transition region between low pressure, Van Vleck-Weisskopf-like behavior (<0.5 atm), and high pressure, Ben-Reuven-like behavior (>4-5 atm). In each case, the mixing ratio of ammonia will be small enough that foreign gas broadening dominates.

06.13-T

Temperature profiles of Neptune's stratosphere between 1983-1990: long term evolution and non isothermal features

F. Roques, B. Sicardy (Obs. Paris, Univ. Paris 6)

Stellar occultations by Neptune observed from the ground between 1983 and 1990 provide twenty two temperature profiles of the planet stratosphere, in the 1-50 μbar pressure range, with planetocentric latitudes ranging from 68°S to 45°N.

These profiles are intermediate between the Voyager RSS occultation profiles, which culminate at $\sim$ 400 μbar, and the Voyager UVS measurements at $\sim$ 0.01 μbar. The typical averaged temperatures that we obtain ($< T >=$ 150-180 K) confirm the general temperature gradient of $(p/T)\partial T/\partial p \sim$ -0.1 in the planet stratosphere, between 10^4 and 10^{-2} μbar.

There appears to be a positive correlation of $< T >$ with the solar activity in the UV (Lyman-α flux), with a time lag of about one year. If confirmed, this trend could give some hints on the heating mechanisms in the 1-50 μbar pressure range.

Superimposed to the general vertical temperature gradient are strong, transient, non isothermal features, with thermal amplitudes of 30-40 K, over altitude ranges of 20-50 km. While well correlated over distances of 100 km along Neptune's limb, these structures are not correlated over distances of 7000 km. We discuss the possibility of acoustic/gravity waves to explain this features, and we estimate the energy deposited by the waves through dissipation.

Session 7: Asteroids, Meteorites, Dust III
(Moderator TBA)
2:30–3:45, Small Conference Room

07.01

Evidence Against Dusty Regoliths on Small Main Belt Asteroids

G.J. Veeder (JPL/Caltech)

The Infrared Astronomical Satellite (IRAS) Minor Planet Survey (IMPS) is a uniform sample of asteroids down to diameters of about 10 km in the main belt. It confirms the well known bimodal distribution for the visual albedos of large asteroids due mostly to S versus the dark C, D, F and P classes. However, asteroids smaller than 50 km show a flat albedo distribution (0.03 to 0.3). Optimization of IMPS processing to maintain high reliability near the SNR limit supports the conclusion that this result is not a systematic artifact. A Monte Carlo simulation qualitatively reproduces the observed difference between the large and small populations by incorporating a "non-standard" fast rotating (high thermal inertia) model for most small asteroids across an albedo distribution assumed to be similar to that of large asteroids. This approach is consistent with the expected change with decreasing diameter from dusty regoliths to bare rock surfaces.

The research described in this abstract was carried out at the Jet Propulsion Laboratory, California Institute of Technology, sponsored by the Air Force Geophysics Laboratory through agreement with the National Aeronautics and Space Administration.

07.02

CCD Photometry of 2060 Chiron during 1985 and 1991

R. L. Marcialis and B. J. Buratti (JPL/Caltech)

2060 Chiron was observed on UT 1991 January 08 with the Mt. Palomar 1.52-m telescope (Gunn-R). The repeatability of the 5.9-hour lightcurve was excellent over $1\frac{1}{2}$ rotations: no evidence for short-term ($\sim$day) secular variation was seen, to within $\lesssim$0.5%. This is in marked contrast to Chiron's behavior in 1990 (Luu and Jewitt 1990; Buratti and Dunbar 1991), when two outburst episodes lasting a few days each were observed.

Although the lightcurve shape is remarkably similar to that seen in 1990, the amplitude is slightly less ($\sim$0.04 mag), and mean brightness slightly higher (H_V = 5.93 mag). This is in contrast to the dimming trend seen since approximately 1989, and demonstrates a well-behaved lightcurve does not necessarily imply low coma activity. All the recent lightcurves show strongly correlated changes (dropouts) over a timescale of perhaps 15 min, with these same features marginally visible in the 1986 lightcurve (Bus *et al.* 1987). We interpret such behavior as evidence that Chiron may be more aspherical than a 4% intensity variation might otherwise indicate, and favors a viewing geometry where subearth latitude is rather low.

At H_V = 6.84 mag, Chiron was dimmer in 1985 when a partial lightcurve was obtained by Marcialis (1989). This is intrinsically the faintest it has ever been observed. Nevertheless, there is evidence for some cometary activity even back then. We note these observations place a stricter constraint on the product (albedo × cross-sectional area). A revised "nucleus + coma" photometric model is consistent with this interpretation and will be presented.

(Work performed under contract to NASA).

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