bably between 3 and 4, we estimate the mean wavelength to be 1.4 mm.

The field of view of the instrument was of the order of 1′ quasicircular, determined from observations of unresolved sources such as planets. The absolute calibration of the flux was made through a straightforward comparison between the observed cometary emission and the flux coming from different planets, observed through the dome during the same day (J.D.G.R. *et al.*, unpublished), corrected for the atmospheric attenuation given by the relationship $\exp(-a \sec z)$, where a is a function of time and z is the zenith angle. The position of Venus and Jupiter very close to the comet made this calibration particularly easy.

During the first period, Comet Kohoutek (1973f) was detected clearly on December 30, 1973. On the first evaluation, the cometary flux was of the order of 100 ± 30 Jy. It was even possible to map the comet's head (Fig. 1). In spite of the poor spatial resolution, it is quite clear that this shape is elongated and orientated in the direction of the Sun, demonstrating that it was the comet, which was under observation.

We next observed the comet on January 12, 1974, when it was much fainter: its flux was then of the order of 10 ± 5 Jy. This result, compared with the first, shows that to a first approximation the cometary flux at a wavelength of about 1.4 mm seems to decrease as r^{-2}, where r is the distance from the comet to the Sun.

The total energy available for heating the dust grains is given by:

$$E_t = \sigma T^4 \sim 1/r^2$$

Therefore, the temperature of the grains should change as $r^{-1/2}$. The observed decrease in flux density is much more rapid than anticipated, implying a decrease in the global emissivity of the dust cloud.

This decreasing rate of emissivity may arise from several sources. Two likely possibilities are, first, a change of the dimensions of the emitting head (that is, a probable change in the production rate of dust); second, a change in the emissivity of the dust grains.

Consider the first hypothesis, and suppose that the flux should change as $\Delta^{-2} r^{-1/2}$, where Δ represents the distance between the comet and Earth. It can then be calculated, to fit the observed variation ($\Delta^{-2} r^{-2}$) to the predicted variation, that the size of the head changed at that wavelength from roughly 1′ at the end of December to about 20″ around January 12, 1974.

This observation, which represents the first detection at 1.4 mm of a cometary emission, provides new information concerning the rate of dust production and the ejection mechanism of the dust. Comparison of this observed flux with others made at shorter and longer wavelengths, using the black-body emission law, will probably give the dependence on wavelength of dust grain emissivity, which is directly related to their composition and size.

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P. BRUSTON
N. CORON
G. DAMBIER
C. LAURENT
J. LEBLANC
P. LENA
J. D. G. RATHER
A. VIDAL-MADJAR

Laboratoire de Physique Stellaire et Planetaire,
Boite postale n 10,
91370—Verrieres le Buisson, France

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Microwave search for molecules in Comet Kohoutek

WE report here a molecular radio line search in Comet Kohoutek using the 108–116 GHz spectral line receiver on the NRAO 36-foot telescope during January 14–18, 1974. We discuss some of the reasons for the negative results obtained in our search for transitions of methyl cyanide, cyanogen, cyanoacetylene, propynal and formic acid (all good 'parent' molecules for the diatomics and radicals known in the optical spectra of comets).

We particularly searched for the two transitions of methyl cyanide which had been detected by Ulich and Conklin[1] when the comet was 0.8 AU from the Sun before perihelion. As we were observing the comet after perihelion, when it was approximately the same distance from the Sun, the temperature of the cometary material and the excitation conditions should have been comparable. The transitions were detected at the level $T_A \sim 0.6 \pm 0.1$ K, and our peak-to-peak upper bound for the transitions was $T_A \sim 0.3$ K.

Initially, we thought that this might indicate a time dependence in the sublimation of 'parent' molecules, perhaps caused by inhomogeneities in the composition of the comet nucleus. We have since learned, however (T. Clark, private communication) that there was a 'time of flight' error in the position ephemeris of the comet that we and many other radio-astronomers used. During our observations, the magnitude of the error was $\sim 45''$, as it was during the observations of Ulich and Conklin who used the same ephemeris. For observations with beamwidth 1′, a pointing error of this magnitude is clearly very serious. It seems unwarranted therefore to draw many conclusions about the existence of molecules in the comet from these observations.

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M. N. SIMON

Biology Department,
Brookhaven National Laboratory,
Upton, New York

T. OWEN M. SIMON

Department of Earth and Space Sciences,
State University of New York,
Stony Brook, New York 11790

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Solar neutrino puzzle

DAVIS and his collaborators, using a technique based on the reaction $^{37}Cl(\nu,e^-)^{37}Ar$, have been able to set a bound to the flux of neutrinos arriving from the Sun. The latest experimental results[1] correspond to 1 SNU (solar neutrino unit, 1×10^{-36} neutrino capture per ^{37}Cl nucleus per second), whereas solar models yield values higher by one order of magnitude[2]. Here I propose an explanation of the discrepancy between theory and experiment on the basis of the assumption that strong interactions between nuclear particles are of gravitational nature[3–6].

I shall assume that within the range of nuclear forces, the gravitational constant is 38 orders of magnitude larger. For