TUESDAY, 18 JANUARY

Session 14: Bora Bora, 0930-1230

14.01.01 A 2-25 Micron Fourier Spectrometer.
A. Tokunaga*, NASA/Ames Research Center, and R.P. Knacke,
SUNY-Stony Brook. - A rapid-scanning, two-beam Fourier
spectrometer for use at the earth's focus of the 1.3m
Mt. Hopkins telescope is described. The interferometer is
an ideal 3-3 with a maximum mirror travel of one
centimeter, and the detector is a gallium-doped germa-
nium bolometer. The instrument has a maximum resolution
of 2000 (0° = 0.5 cm⁻¹) at 10 microns. First-order sky
subtraction is achieved by using two beams which are
symmetric about the beamsplitter. Three beamsplitters
are used which have maximum efficiencies centered at 3.5,
10, and 20 microns. Interferograms are coherently
summed at the telescope in a multichannel analyzer and
recorded on 3-track magnetic tape. Data frequencies of
30-100 Hz are typically used. Background emission
is limited with narrow-bandpass, cold interference
filters (0.1 - 1.0μm) so that the Pleiades advantage is
largely realized at 10 microns. The performance of the
system is discussed with examples of recent observations
of Jupiter and Saturn at 10 and 20 microns (Tokunaga,
*NASA/Ames Resident Research Associate.

14.02.02 Infrared Photometric and Polari-
metric Observations of Comet West 1975n. S.Sato
K.Noguchi, K. Kawara, K. Kodama, H. Maihara,
H. Okuda, Kyoto Univ., Kyoto, Japan, and N.Oishi,
Tohoku Univ., Sendai, Japan. Comet West 1975n has been observed photometrically
and polarimetrically by using the 1 m tele-
scope at Agenas Infrared Observatory of Kyoto University. Band energy spectra between 1
and 20 microns consist of two components; scattered
light of the solar radiation, dominant in wavelengths less than 2.2 microns and thermal
emission beyond it. The former spectra are al-
most parallel to the solar spectrum. The latter spectra show broad black body like spectra,
associated with the silicate peak at 10 microns.
The color temperatures of the thermal emission
are slightly higher than the equilibrium tempe-
rameter with the solar radiation. Spectrophoto-
metry in 2.8 - 4.0 micron region did not detect
any trace of the ice absorption at 3.07 microns.
Polarimetry were carried out at I, J, H and K-bands in scattering angles of 70° to 120°. Deg-
rees of the polarizations are almost achromatic between 1 and 2.2 microns, having a peak value
of 30 percent nearly at the scattering angle of
90°. These observational results can be ex-
plained more favorably by metallic dust parti-
cles or those with large imaginary refractive
index rather than dielectric particles.

14.03.03 Near Infra-Red Observations of "Five-
Minute" Oscillations in the Quiet Solar Atmosphere.
T. Alan Clark and D.A. Burrell, Rothney Astrophys-
ical Observatory, Dept. of Physics, U. of Calgary. - A rapid-
scanning Michelson interferometer has been used to
monitor the quiet solar surface through a 54° aperture
over the range 1700 to 3000 cm⁻¹ to a resolution of
10 cm⁻¹. Fourier analysis of a 90 minute series of
spectra revealed significant periodic activity
fluctuations with periods of 183, 213, 284 and 334s,
after normalization of spectra to intensities at
specific wavenumbers had reduced considerably the atmos-
pheric transmission fluctuations. Analysis of the wave-
number dependence of these peaks indicated two specific
regimes in the data. (1) The periodicity at 284s (and
a weaker peak at 213s) is found only over a wavenumber
delineating CO bands, in individual lines of which
significant "5 minute" variations have been detected by
Noyes and Hall (Ap. J., 176, 89, 1972) and apparently
indicate fluctuations near the temperature minimum.
(2) Continuum fluctuations at periods of 183 and 334s
have been detected over this whole spectral range.
Periodic behavior of fluctuation amplitude with wave-
number seems to indicate the existence of vertically
moving waves in the lower solar atmosphere. This work
has been supported by the National Research Council
of Canada.

14.08.12 Spatial Interferometry of a
Orionis and Vy Canis Majoris at 10-Microns.
The two-element spatial interferometer de-
scribed previously by Johnson et al (Phys. Rev.
Lett. 33, 1617, 137%) is being used to measure
the sizes of circumstellar dust shells. a
Orionis has been observed at fringe spacings
varying from 0.4" to 0.7". At these spacings
the interference signal was as large as ex-
pected on the basis of the power seen in the
4" beam of a single telescope. This indicates
that most of the 10-micron flux of a Orionis
comes, as is expected, from a region smaller
than 0.4". Preliminary results on Vy Canis
Majoris indicate that the source is already
resolved at fringe spacings between 0.4" and
0.6". The instrument used in these measure-
ments consists of two heterodyne receivers
which detect the radiation collected by the
twin 81-cm auxiliary telescopes at the McMath
Solar Telescope of Kitt Peak National Observa-
tory. These telescopes are separated by a
fixed 5.5 meter east-west baseline. Recent
advances in the fabrication of HgCdTe photo-
diodes allow operation of each receiver with
a system sensitivity of 10⁻¹⁰ watts in one
second of integration time and with an infrared
bandwidth of 3000 MHz (0.1 cm⁻¹). This