

FINAL REPORT

For Period April 1, 1972 - June 30, 1974

Under Contract No. NGR 12-001-111

Mauna Kea Observatory Infrared Observations

Principal Investigator:

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Institute for Astronomy

University of Hawaii

(NASA-CR-138965) MAUNA KEA OBSERVATORY  
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## I. Introduction

The referenced grant, in the sum of \$38,282, was provided to help support the operation of Mauna Kea Observatory, and specifically to facilitate research programs in infrared studies of stellar and galactic sources.

## II. Time Allocations for Visiting Astronomers

During the 26-months covered by this grant, 13 groups of visiting astronomers were granted a combined total of 103 nights on the 2.24-meter telescope for infrared observing studies. The number increased toward the end of the grant period, as a result both of the larger number of high-quality applications received as the reputation of Mauna Kea as a site for infrared observation became better established, and because of the willingness on the part of the University of Hawaii's Institute for Astronomy to grant time to guest observers.

Infrared programs carried out by guest observers during the grant period are listed in the table.

## III. Time Allocation for Staff Infrared Astronomy

Support under this grant has also facilitated infrared observing programs by our own staff. During the grant period, a total of 252 nights were assigned to staff members for galactic and solar system infrared observation using a broad variety of radiometric and spectroscopic instrumentation.

## IV. Publications

During the grant period, 11 papers by our own staff in the areas of stellar and galactic infrared research or dealing with Mauna Kea as an infrared site, were published or accepted for publication. Nine papers were submitted or published by guest observers. A listing is shown below.

### STAFF PUBLICATIONS

T. Simon, N. Morrison, S. Wolff and D. Morrison, "Far-Infrared and uvby Photometry of V1057 Cygni," Astronomy and Astrophysics, 20 99-104, 1972.

T. Simon, D. Morrison, and D. Cruikshank, "Twenty-Micron Fluxes of Bright Stellar Standards," Astrophys. J. (Letters), 177, L17, 1972.

"Is NGC 1068 an Infrared Variable?" D. Morrison and T. Simon, BAAS, (Abstract) 5, 40, 1973.

D. Morrison, R.E. Murphy, D.P. Cruikshank, W.M. Sinton, and T.Z. Martin, "Evaluation of Mauna Kea, Hawaii as an Observatory Site," PASP, 85, 255, 1973.

Sinton, William M. "Does Io Have an Ammonia Atmosphere?" Icarus, 20, 284, 1973.

D. Morrison, and T. Simon, "Broad Band 20-Micron Photometry of 76 Stars," Astrophys. J., 186, 193, 1973.

Cruikshank, Dale P. and Morrison, D. "Radii and Albedos of Asteroids 1, 2, 3, 4, 6, 15, 51, 433, and 511," Icarus, 20, 477-481, 1973.

Morrison, D. and D.P. Cruikshank, "Physical Properties of the Natural Satellites," Space Science Reviews, 15, 641-739, 1974.

Murphy, Robert E. and Fesen, Robert A. "Spatial Variations in the Jovian 20-Micrometer Flux" Icarus, 21, 42-46, 1974.

Dyck, H.M., Capps, R.W. and Beichman, C.A. "Infrared Polarization of the Galactic Nucleus" Ap. J., 188, L103-L104, 1974

Morrison, D. with Chase, S.C., Miner, E.S., Munch, G., and Neugebauer G. "Preliminary Infrared Radiometry of Venus from Mariner 10," Science, 183, 1291-1292, 1974.

#### GUEST OBSERVER PUBLICATIONS

E.E. Becklin, and G. Neugebauer, "The Spatial Distribution of the Infrared Emission from NGC 7027," (submitted August 1973).

E.E. Becklin, G. Neugebauer, J. Frogel, D. Kleinmann, S. Persson, C. Wynn Williams, "Infrared Emission from the Southern H II Region H2-3," Astrophys. J., 187, 487, 1974.

\_\_\_\_\_, "The Spatial Distribution of the Infrared Emission from NGC 7027," (submitted October 1973).

G.R.H. Rieke, D. Harper, F. Low, K. Armstrong, "350-Micron Observations of Sources in H II Regions, the Galactic Center, and NGC 253," (submitted October 1973).

C.G. Wynn Williams, E.E. Becklin, G. Neugebauer, "Infrared Studies of H II Regions and OH Sources," Astrophys. J., 187, 473, 1974.

D.W. Gezari, R.R. Joyce, M. Simon, "Measurement of the Solar Brightness Temperature at 345, 450, and 1000 Microns," Astron & Astrophys, 26, 409-411, 1973.

\_\_\_\_\_, "Galactic Nucleus at 350 Microns," Astrophys. J. (Letters), 179, 167, 1973.

D.W. Gezari, R.R. Joyce, M. Simon, G. Righini, "A Strong 350-Micron Source in the Ophiuchus Dark Cloud," Astrophys. J. (Letters), 186, 127-130, 1973.

\_\_\_\_\_, "350-Micron Mapping of the Orion Molecular Cloud," (submitted June 1974).

Infrared Programs Carried Out by Guest Observers at Mauna Kea

<u>Name</u>	<u>Institution</u>	<u>Number of Nights</u>	<u>Program</u>
<u>April 1, 1972 - September 30, 1972</u>			
J. Gaustad	U.C. Berkeley	6	Spectroscopy at 5 to 20 microns
F. Low/G. Rieker	U.C. Berkeley	5	H II regions and extra-galactic objects at 400 microns
<u>October 1, 1972 - March 31, 1973</u>			
J. Gaustad	U.C. Berkeley	6	Fourier-transform spectroscopy at 10 to 20 microns
I Nolt	U. of Oregon	4	Radiometry of galactic sources at 35 microns
<u>April 1, 1973 - September 30, 1973</u>			
J. Gaustad	U.C. Berkeley	5	Emission spectra of stars at 10 to 20 microns (Fourier transform spectroscopy)
D. Gautier	Observatoire de Paris	8	Jupiter at 8 to 12 microns
I. Nolt/J. Radostitz with R. Murphy/W. Sinton	U. Oregon U. of Hawaii	5	Emission and transmission of sky at 28 to 40 microns. Also broad-band 35-micron photometry on bright sources
G. Neugebauer	Cal. Tech.	7	Multiplier photometry and spatial mapping of stars, H II regions, dust clouds, and galaxies at 10 and 20 microns

<u>Name</u>	<u>Institution</u>	<u>Number of Nights</u>	<u>Program</u>
M. Simon	SUNY, Stonybrook	4 on 224-cm 8 on 61 cm	Sun, moon, galactic center, H II and dust regions, extra galactic objects at 350 and 450 microns.
J. Wampler	U.C. Santa Cruz	5	Deep photography of selected regions in the North Galactic Cap (350 microns)
<u>October 1, 1973 - June 30, 1974</u>			
A. Lane/T. Johnson	Jet Propulsion Lab	8	Photometry of Comet Encke; photometry of vidicon, comets, saturn, Uranus
M. Simon	SUNY, Stonybrook	12	350-micron photometry of comet Kohoutek, and Orion region; Obs. of IRC 10216 at 350 microns and 1 mm.
C. Townes	U.C. Berkeley	10	20 and 10-micron spectroscopy of planetary nebulae, stars, and the Galactic Center. High-resolution observations in the 5-and 10-micron region.