the data have been analyzed with the RICHFLD program at KPNO. This program scales an average point spread function built up from images of one or more single, uncrowded stars on each frame to determine the magnitude. Due to a technical difficulty in the data reduction we have yet to determine reliable zero-points for the magnitude scales of each frame, but the instrumental CMD's are extremely instructive and allow us to draw the following firm conclusions.

NGC 2257: Our photometry of 900 stars reaches $V = 24$ mag and samples the upper 1.5 mag of the main sequence. The CMD has the same morphology as CMD's of the galactic globular clusters, including a difference in horizontal-branch and turnoff luminosities of about 3.3 mag. Using Walker's (*M.N.R.A.S.* **156**, 459, 1972) electronographically measured stars to set approximately the zero points of the V and $(B-V)$ scales, we see that the turnoff is at $V = 22.2$ or 22.3 mag. This is in excellent agreement with that inferred by Stryker (*Ap. J.* **266**, 82, 1983) from analysis of photographic photometry of one plate pair and by Hesser, Harris, and Atwood (1983, in preparation) from SIT vidicon imagery of the cluster. Thus, the LMC contains a population as old as the galactic globular clusters ($\sim 16 \times 10^9$ yrs), even though the history of star formation in the two galaxies is very different.

LW4: This sparse cluster, also in the outskirts of the LMC, was suggested to us by P. Hodge as a possible, but previously overlooked, globular cluster. Our data for 46 stars show, however, that it is much younger than classical globular star clusters. Indeed, its CMD is remarkably similar to that of the galactic open cluster NGC 7789, which has an age of a few billion years.

THE LOCATION OF THE SULFUR DIOXIDE ON IO

R. R. HOWELL, D. P. CRUIKSHANK, AND F. P. FANALE
University of Hawaii

Analysis of 4 μm spectrophotometry of Io and laboratory spectra of SO_2 frost indicates that large amounts of SO_2, probably in the form of frost, must exist on the satellite. The SO_2 coverage is large enough that it must be present in several of the geologic units on Io besides the white plains. In order to explain the relatively low near UV albedo of these regions (SO_2 frost has a high albedo) the frost must be mixed intimately with other material, presumably sulfur. The existence of significant SO_2 in these other units, which are darker in the visible and therefore warmer, may place constraints on resurfacing rates for these units and on models of SO_2 in that atmosphere.

NEW INFRARED OBSERVATIONS OF THE OMC-2 CLUSTER

Y. PENDLETON-SCHISLER* AND M. WERNER*
NASA Ames Research Center
R. CAPPS
Institute for Astronomy, University of Hawaii
AND
H. DINERSTEIN*
University of Texas at Austin

We report new observations of the infrared cluster of low-luminosity protostars in Orion Molecular Cloud 2 (OMC2). The OMC2 cluster is located $\sim$ 12′ northeast of the Trapezium cluster in Orion and covers a region of $\sim$ 1′. OMC2 contains five separate components at 2.2 μm (Gatley et al., *Ap. J.* **191**, L121, 1974) and has a total luminosity of 2100 $L_\odot$ into a 3.″5 diameter beam (Thronson et al., *A.J.* **83**, 492, 1978). Recent reports show that near-infrared reflection nebulae are often observed around embedded protostellar objects. Through an observing program at the NASA Infrared Telescope Facility of near infrared polarimetry, photometry, and spectrophotometry we have determined that the extended emission around the infrared source referred to as OMC2-IRS1 is in fact another infrared reflection nebula. The extended emission has an asymmetric distribution about the illuminating source, IRS1; this also seems to be a common phenomenon among infrared reflection nebulae. Measurements from 1.2 to 5 μm show that the surface brightness of the reflection nebula remains fairly constant out to a radial distance of $\sim$ 15″ from IRS1. The OMC2-IRS1 reflection nebula will be a good source upon which to base models of infrared reflection nebulae in order to determine dust grain properties and the physical conditions in star formation regions.

We have also resolved the infrared source OMC2-IRS4 into two components at infrared wavelengths, which are separated by 4″ in the north-south direction. The southern infrared component coincides with the northern of the two objects seen in this region at 0.94 μm (Cohen and Frogel, *Ap. J.* **211**, 178, 1977). The northern infrared component is seen most clearly at 3.8 and 5 μm and shows 20% polarization at 3.8 μm.

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*Visiting Astronomer at the Infrared Telescope Facility which is operated by the University of Hawaii under contract from the National Aeronautics and Space Administration.