the fact that their observed ratio $K/H=2$ cannot be explained by the models.

Preliminary Results of the First Infrared Astronomical Rocket Flight. MARTIN HARWIT, *Cornell University* AND D. P. McNUTT, K. SHIVANANDAN, AND B. J. ZAJAC, *Naval Research Laboratory*.—The primary purpose of the payload (see abstract by McNutt *et al.*, this issue, p. 170) was to look at diffuse astronomical sources and make measurements of the infrared background radiation. Such measurements cannot be made from the ground or from balloons because even at balloon heights atmospheric effects are important. As the rocket rolled and precessed, our telescope swept out differing parts of the earth and sky. Twenty-four scans were obtained during 300 useful seconds of flight. The peak altitude reached was 127.3 miles. We have obtained a preliminary aspect solution which gives the instantaneous viewing direction to an accuracy of about 5° over a limited portion of the flight. This is not yet quite good enough to allow us to determine whether or not several weak blips on the record signify discrete sources. Such a determination requires a check to ensure that each source registers a signal each time the telescope scans across it. We can report on one definite result.

We have selected portions of the record during which the telescope pointed near the zenith where stray radiation from the horizon was not significant. We find a small but probably insignificant average signal in the 1 to 3 μ region, relative to "dark" measurements taken a few minutes prior to launch. In the 3 to 7 μ region there is a slight positive signal well within the bounds defined by noise. Upper limits to the night sky radiation—assuming isotropically radiating diffuse sources—amount to 2×10^{-12} erg/cc in the 1 to 3 μ and 2×10^{-11} erg/cc in the 3 to 7 μ region. These values probably are three to five orders of magnitude more sensitive than previous upper bounds based on considerations involving the thermal balance of the atmosphere.

Some Principles for a Physical Relativity. CHARLES HETZLER, *Roger Williams College*.—An attempt to clarify and amplify the physical picture and implications of relativity to date starts out with six statements, assumed observationally valid, as pertinent to understanding light in relation to motion, 3, 4, and 5 being corollaries of the second: 1. Light is emitted and received discontinuously in radial multi-frequency bursts of finite energy in the form of individually transverse, polarized waves of constant velocity in matterless space but affecting and being affected by matter as shown by dispersive, reflective, Fizeau, Čerenkov, Compton, photoelectric, etc., ef-

fects. 2. The velocity of light is the same for all frequencies and all observers, being the constant of the inverse proportionality between wavelength and frequency as these change with motion of source or observer relative to the direction of the light according to the Doppler principle. 3. Frequency, wavelength, color, rate of energy reception differ for observers having different motions relative to the direction of light. 4. The frequency traveling through space will differ from frequency of source and from frequency received depending on the respective motions relative to space, but this may defy detection. 5. The number of waves received over a moving invariant length is proportional to the space distance, invariant, the light travels, since source and received wavelengths are the same. 6. Proper motion data indicate there are solar and galactic aberrations of light to be added to the oscillating terrestrial aberration, which together would give one component of the earth's motion relative to light in space, whereas Doppler effects have been able only to measure the other component relative to sources in space and not to the light in space.

The possibility of absolute motion is not ruled out but 4, 5, and 6 point out difficulties of its detection. Invariants of length and time are considered determinable only in terms of arbitrary standards.

An analysis of the M - M experiment using the above principle finds numerous significant changes of frequency and velocity due to dispersive, Doppler, and Fizeau effects that differentially exactly cancel over the two paths so that the usual phase difference still is found. Because Lorentz contraction would affect wavelengths as well as apparatus and not change their number this explanation of the null effect is considered untenable. The question is raised whether the various shifts in wavelengths, velocities, and in numbers of waves along different sections of the paths might "interfere with interference" somewhat as higher orders of interference become diffused.

Newly Discovered Clusters of the Large Magellanic Cloud. PAUL W. HODGE, *University of Washington*.—Using a two-color series of ADH Schmidt plates covering the central 125 sq deg of the Large Magellanic Cloud, the author has carried out an extensive search for nonstellar objects belonging to (or superimposed upon) the Cloud that has resulted in the discovery of 455 new objects, nearly all of which are small open clusters. From a comparison of the catalogue of Shapley and Lindsay with that of Lyngå and Westerlund; the author finds that there was a previously known total of 1146 clusters. The new objects increase this total to 1601, somewhat larger than the total number of known clusters of our own Galaxy. The projected distribu-