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INFRARED PHOTOMETRY OF ALGOL

The triple system eclipsing binary Algol have been observed over a wide range of wavelengths -- from X rays to radio. Infrared observations to data have been at 1.6 microns (Chen and Reuning, 1966); 5 microns (Jameson et al.,1973); 2.2, 3.6, 4.8, and 8.6 microns (Longmore and Jameson, 1975); 2.2 microns (Smyth et al., 1975); 4.8 microns (Magro et al., 1977); and 10 microns near secondary minimum (Nadeau et al., 1978). Some of these observations did not have very much time resolution or contained large statistical errors. These limitations on the data make it difficult to develop comprehensive theoretical models of the infrared emission from the system. To provide a better observational foundation, we have begun a program of infrared observations of Algol with the 1.3-meter telescope and InSb detector ("Otto") at Kitt Peak National Observatory. Here we present our preliminary results.

All observations have been made during the day with a 23" or 32" aperature. Beam switching 60" in declination cancelled the infrared background. The standard star of all observations was Alpha Persei, whose magnitudes are J = +0.874, H = +0.647, K = +0.565, L = +0.459, and M = +0.36. Extinction correction were usually small at all wavelengths.

Figures 1-6 summarize the results so far. The phase was calculated from primary minimum by JD = 2440953.4657 + 2.8673075 E (Ashbrook, 1976). Figure 1 show a little more than half of the primary eclipse on 10 February 1979 (U.T.). Complete sets of data were taken every ∿ 5 minutes; the M data was averaged so

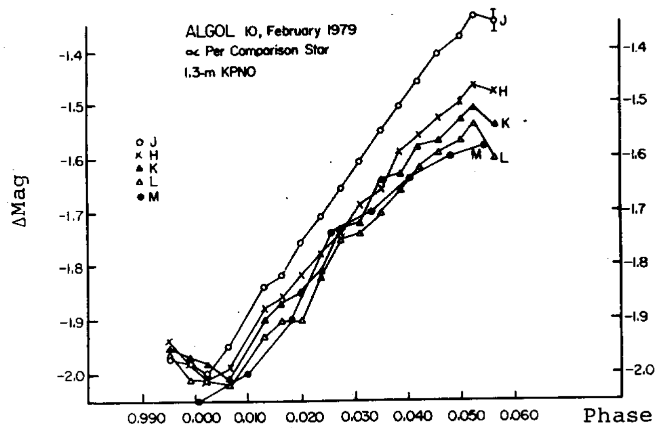

Fig. 1

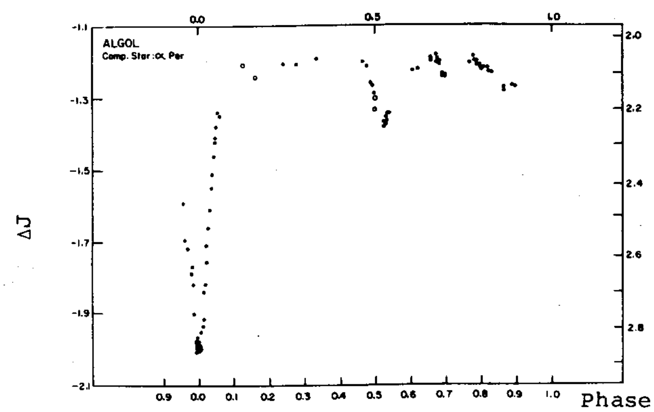

Fig. 2

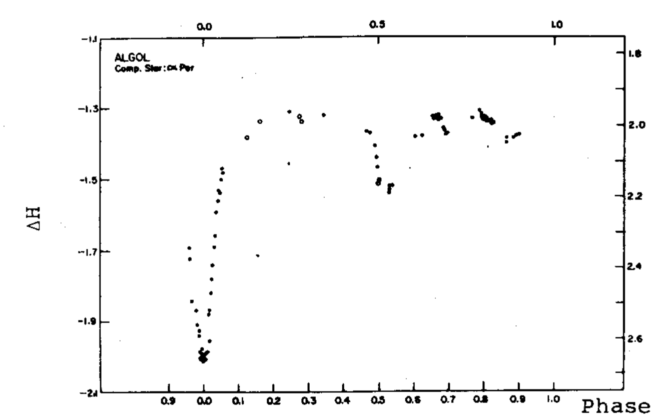

Fig. 3

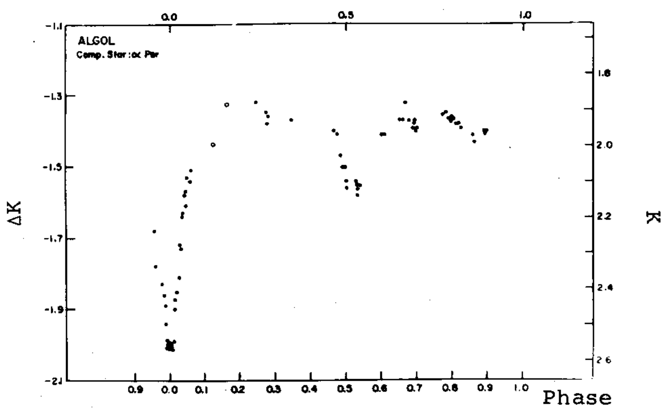

Fig. 4

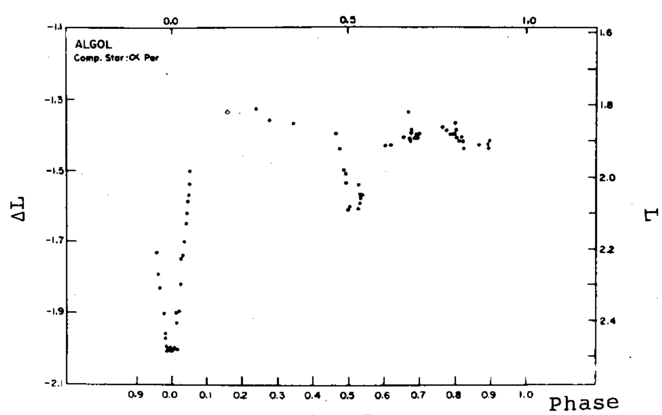

Fig. 5

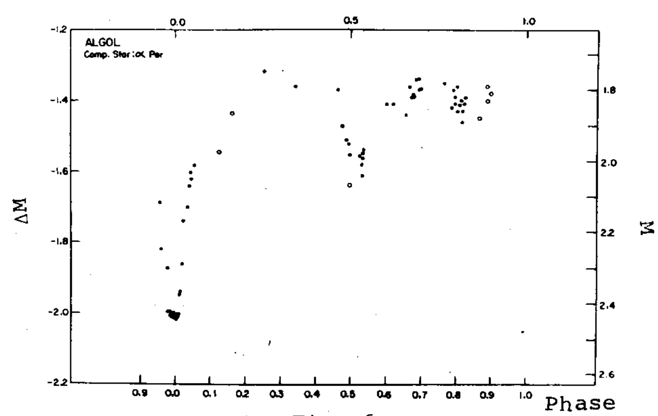

Fig. 6

each point is roughly 10 minutes apart. Note than the eclipse is fainter and shallower at longer wavelengths.

Figures 2-6 show light curves at J, H, K, L, and M bands. (Open circles indicate marginal data.) From these data, we find that the magnitudes during primary eclipse are: J = +2.87 $\pm$ 0.01, H = +2.65 $\pm$ 0.01, K = + 2.57 $\pm$ 0.01, L = +2.50 $\pm$ 0.01, M = +2.49 $\pm$ 0.02. During secondary eclipse, the magnitudes are: J = +2.20 $\pm$ 0.06, H = +2.12 $\pm$ 0.03, K = +2.07 $\pm$ 0.03, L = +2.01 $\pm$ 0.01, and M = +1.98 $\pm$ 0.01. Outside of eclipses, we determine that J = +2.08 $\pm$ 0.04, H = +1.99 $\pm$ 0.04, K = +1.93 $\pm$ 0.06, L = 1.89 $\pm$ 0.01, and M = +1.84 $\pm$ 0.01. We had no significant excess at any wavelengths.

We are continuing observations, especially at M, where the scatter in the data is the greatest.

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References:

1. Chen, K.-Y. and Reuning, E.G., Astronomical Journal, vol. 71, 283, 1966
2. Jameson, R.F., Longmore, A.J., and Crawford, B., Nature, vol. 242, 107, 1973
3. Longmore, A.J. and Jameson, R.F., Mon. Not. R. Astr. Soc., vol. 173, 271, 1975
4. Magro, C.S., Needham, J.D., Phillips, J.P., and Selby, M.J., Mon. Not. R. Astr. Soc., vol. 180, 461, 1977
5. Nadeau, D., Neugebauer, G., Becklin, E.E., Elias, J., Ennis, D., Matthews, K., and Sellgren, K., Mon. Not. R. Astr. Soc., vol. 184, 523, 1978
6. Ashbrook, J., Sky Telesc. 52, 48, 1976