SIMULTANEOUS 3.8 AND 10 MICROMETER OBSERVATIONS OF THE '91 OCCULTATIONS OF IO BY EUROPA; J. D. Goguen, G. J. Veeder, D. L. Matson, T. V. Johnson, R. H. Brown, JPL/Caltech; D. Toomey, NASA/IRTF; W. M. Sinton

We are using the NASA/IRTF to obtain simultaneous L' (3.8 micrometers wavelength) and N (10 micrometers wavelength) observations of the '91 series of occultations of Io by Europa. The primary scientific objective is to obtain high spatial resolution of the thermal emission from Io's hot spots, although the data also contain valuable information on the temperature distribution on Io's disk and precise satellite astrometry (1). The 2 wavelengths are chosen to discriminate between the 2 temperature components hypothesized to explain the hot spot emission spectrum (2, 3): a hot (600 K) component covering 2% of the emitting area and a warm (300 K) component covering 98% of the emitting area. Measurements in the L' passband are most sensitive to the hot component while measurements in the N passband are most sensitive to the warm component. The highest temperatures present may be indicative of the melting temperature of the magma and evidence of its composition. The warm component radiates 80% of the total power. The latitudinal distribution of the warm sources over Io's surface is needed to improve estimates of the global heat flow. Precise positions for the hot spots are determined from their disappearance and reappearance times. Their sizes are directly measured from the duration of their occultations and temperatures are determined from the measured flux change on disappearance and reappearance.

A total of 8 occultations are scheduled for the simultaneous 2-wavelength observations at IRTF before mid-March. At the deadline for submission of this abstract, the first 2 have been successfully observed.

(1) Goguen, J. D., W. M. Sinton, D. L. Matson, R. R. Howell, H. M. Dyck, T. V. Johnson, R. H. Brown, G. J. Veeder, A. L. Lane, R. M. Nelson, and R. A. McLaren (1988). *Icarus* **76**, 465-484.

(2) Sinton, W. M., and C. Kaminski (1988). *Icarus* **75**, 207-232.

(3) Pearl, J. C., and W. M. Sinton (1982). Hot spots of Io. In *Satellites of Jupiter*, D. Morrison, Ed., U. of Arizona Press, Tucson, pp. 724-755.