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OBSERVATIONS OF THE GALACTIC PLANE BY THE ZODIACAL INFRARED PROJECT

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The two rocket flights of the Zodiacal Infrared Project (ZIP; Murdock and Price 1985, *Astr. J.*, 90, 375), flown 18 August 1980 and 31 July 1981, were intended to provide data on the near-infrared thermal emission of the interplanetary dust cloud over a broad range of ecliptic coordinates (latitudes -60° to $+85^\circ$, solar elongation angles 22° to 90° and 140° to 180°). In addition, their multiple crossings of the Galactic plane provided low resolution spectral data ($\Delta\lambda/\lambda$ ranging from 1. to 0.1, for effective wavelengths from 3 to 30 μm) for most of the first quadrant (longitudes 30 to 100 degrees). Examples are displayed in figure 1. Having made a thorough reanalysis of the calibration of the ZIP database, we present the salient features of the Galactic plane as observed by ZIP.

The binned, in-plane data, corrected for zodiacal emission, generally show an exponential decrease with increasing longitude. Figure 2 displays this for the 11 μm data. The fitted exponential scale-length is $0.038/^\circ$, and can be inverted to derive a radial density profile. Note as well the appearance of excess emission at 83° arising from material associated with the Cyg-X region.

Channel ratios are converted to temperatures by using model spectra in which thermal emitters with emissivity $\sim\lambda^{-1}$ are convolved with the filter responses. The results for channels 5 (11 μm) and 12 (21 μm) are shown in figure 3, along with similarly derived temperatures from IRAS 12 μm and 25 μm data. The ZIP data show little variation with longitude, consistent with IRAS results.

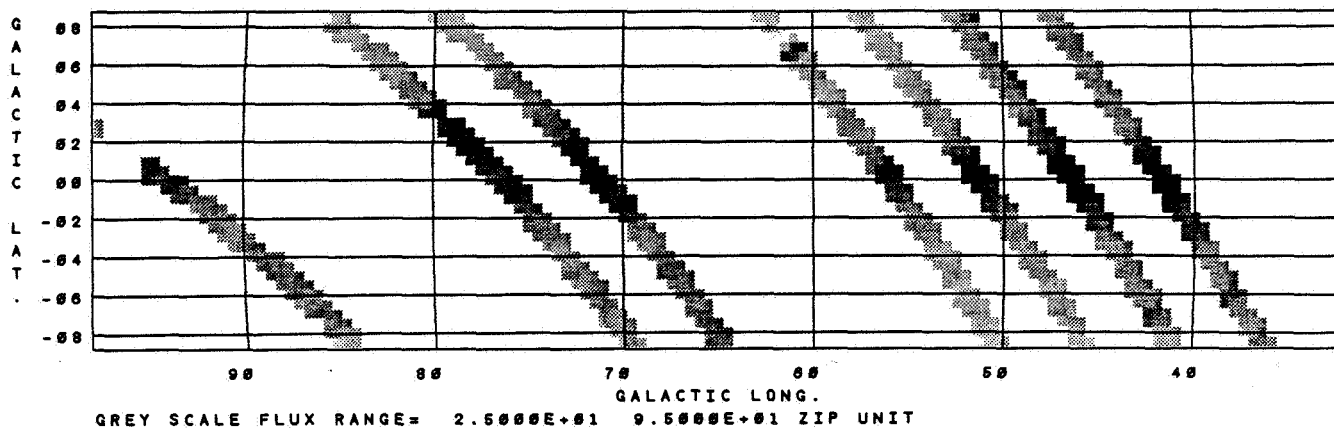
A narrow spectral feature at 13 μm appears consistently in data for the plane (uncorrected for zodiacal emission). However, this is strongly contaminated by calibration problems for channel 8. We suggest that residual emission at 13 μm arises from the [NeII] line at 12.8 μm .

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figure 1

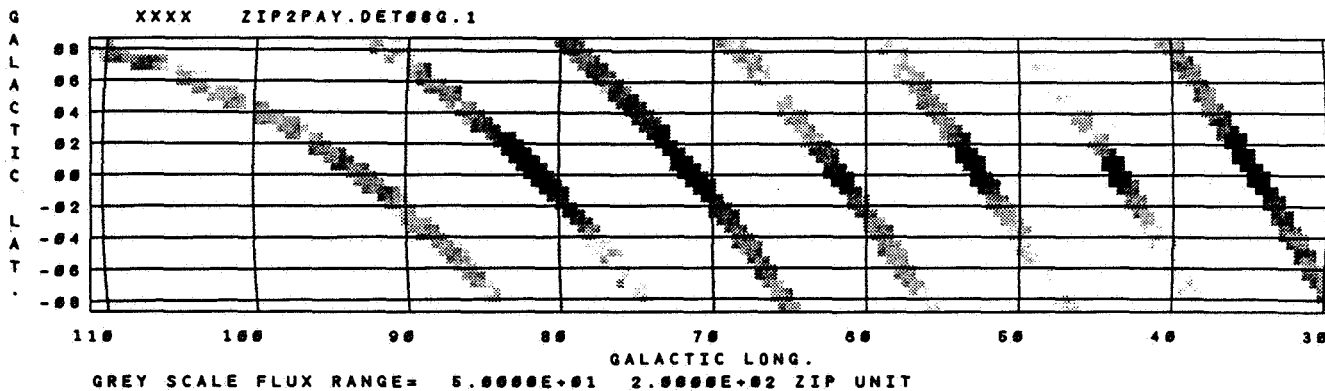
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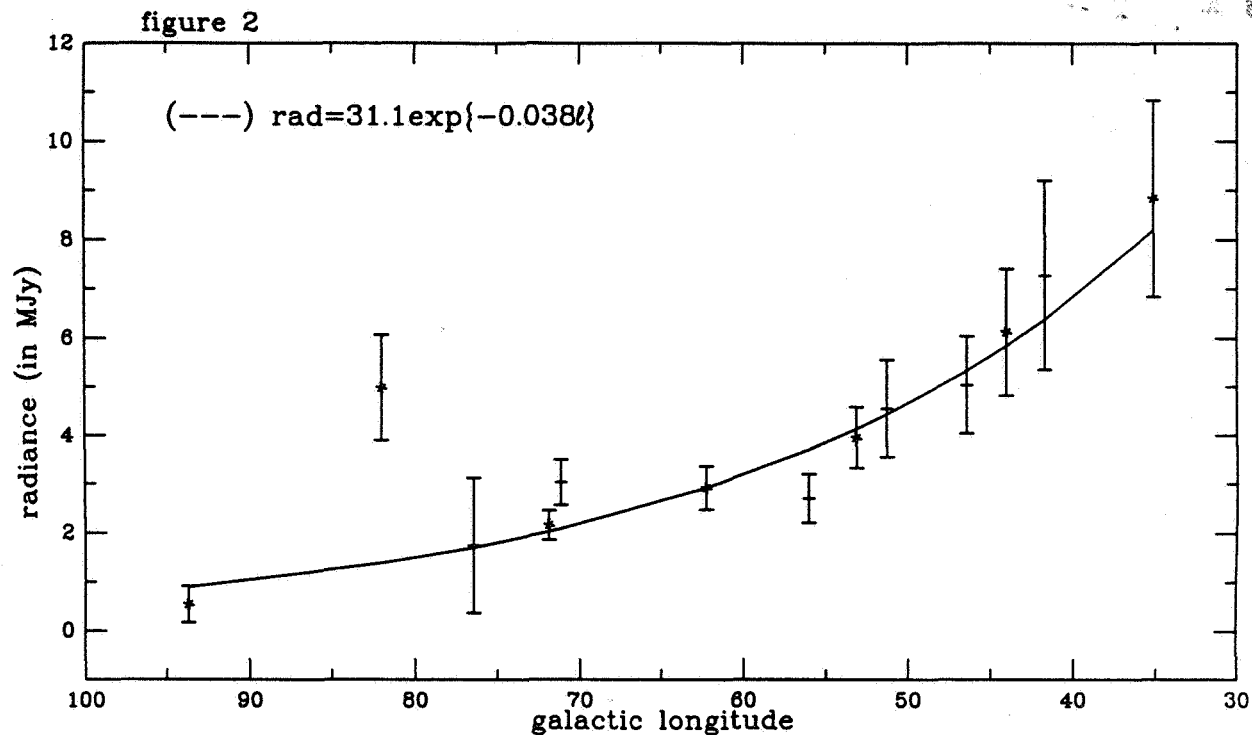


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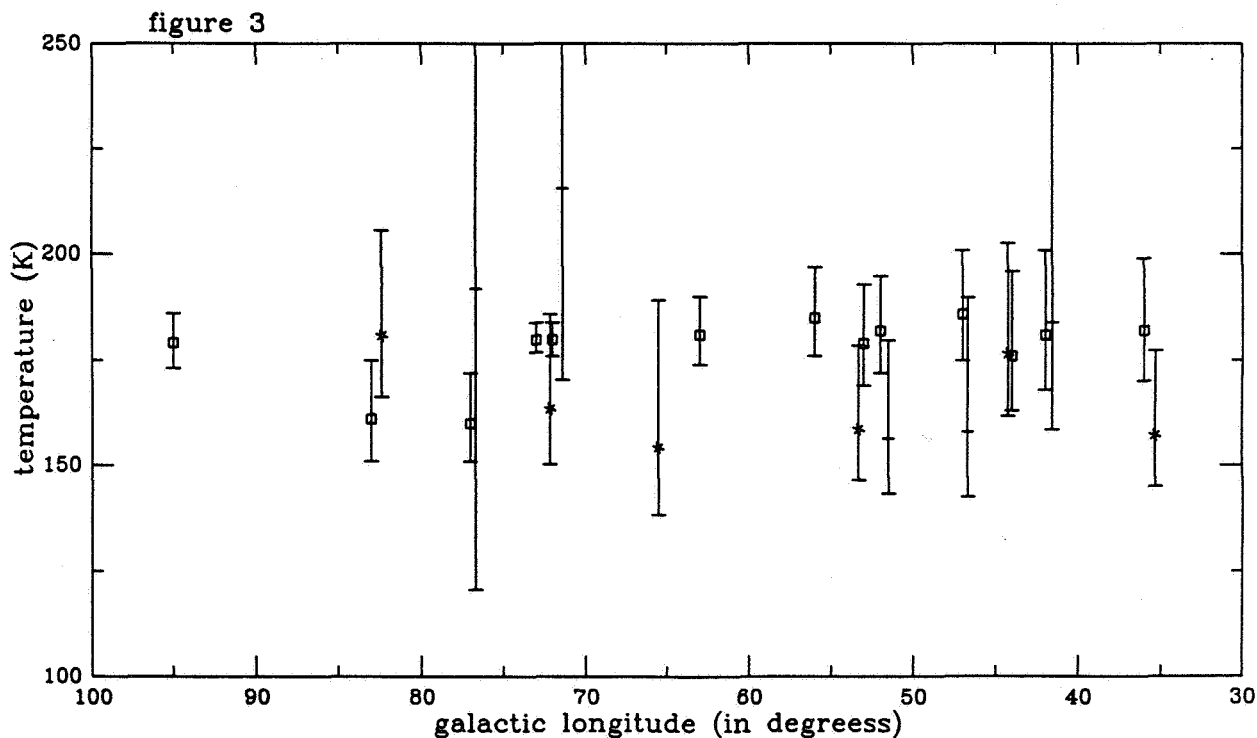
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OBSERVATIONS OF THE GALACTIC PLANE BY THE ZODIACAL INFRARED PROJECT



ZIP 1(+) & 2(*)-DET. 10 GALACTIC CROSSING RADIANCE
WITH 95% CONFIDENCE INTERVAL INDICATED



ZIP TEMPERATURE ALONG GALACTIC PLANE (from D24/D10)

□ IRAS, + ZIP 1 & * ZIP 2 with 2σ indicated