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OBSERVATIONS OF THE GALACTIC PLANE BY THE ZODIACAL INFRARED PROJECT

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*do you*

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  $-60^\circ$  to  $+85^\circ$ , solar elongation angles  $22^\circ$  to  $90^\circ$  and  $140^\circ$  to  $180^\circ$ ). 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  $\mu\text{m}$ ) 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  $\mu\text{m}$  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  $83^\circ$  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  $\mu\text{m}$ ) and 12 (21  $\mu\text{m}$ ) are shown in figure 3, along with similarly derived temperatures from IRAS 12  $\mu\text{m}$  and 25  $\mu\text{m}$  data. The ZIP data show little variation with longitude, consistent with IRAS results.

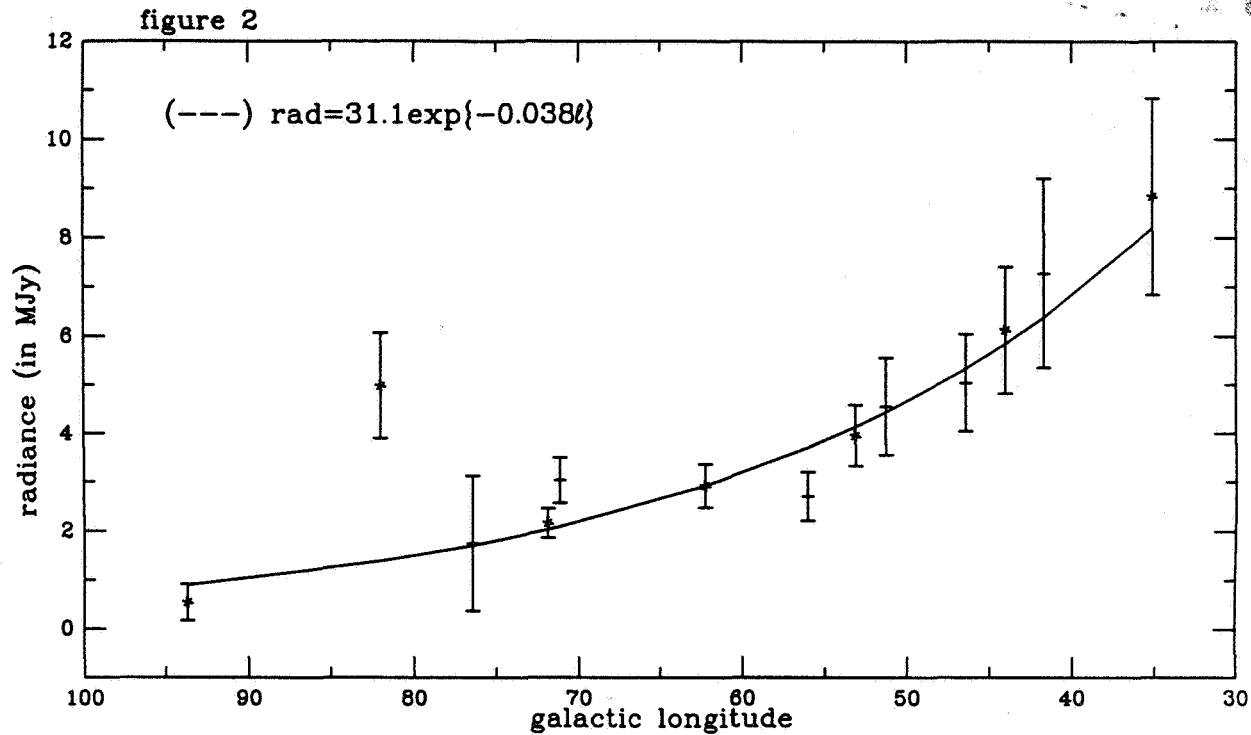
A narrow spectral feature at 13  $\mu\text{m}$  appears consistently in data for the plane (uncorrected for zodiacal emission). However, this is strongly contaminated by calibration problems for channel 8. We suggest that residual emission at 13  $\mu\text{m}$  arises from the [NeII] line at 12.8  $\mu\text{m}$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

*appear lambda (-1)*

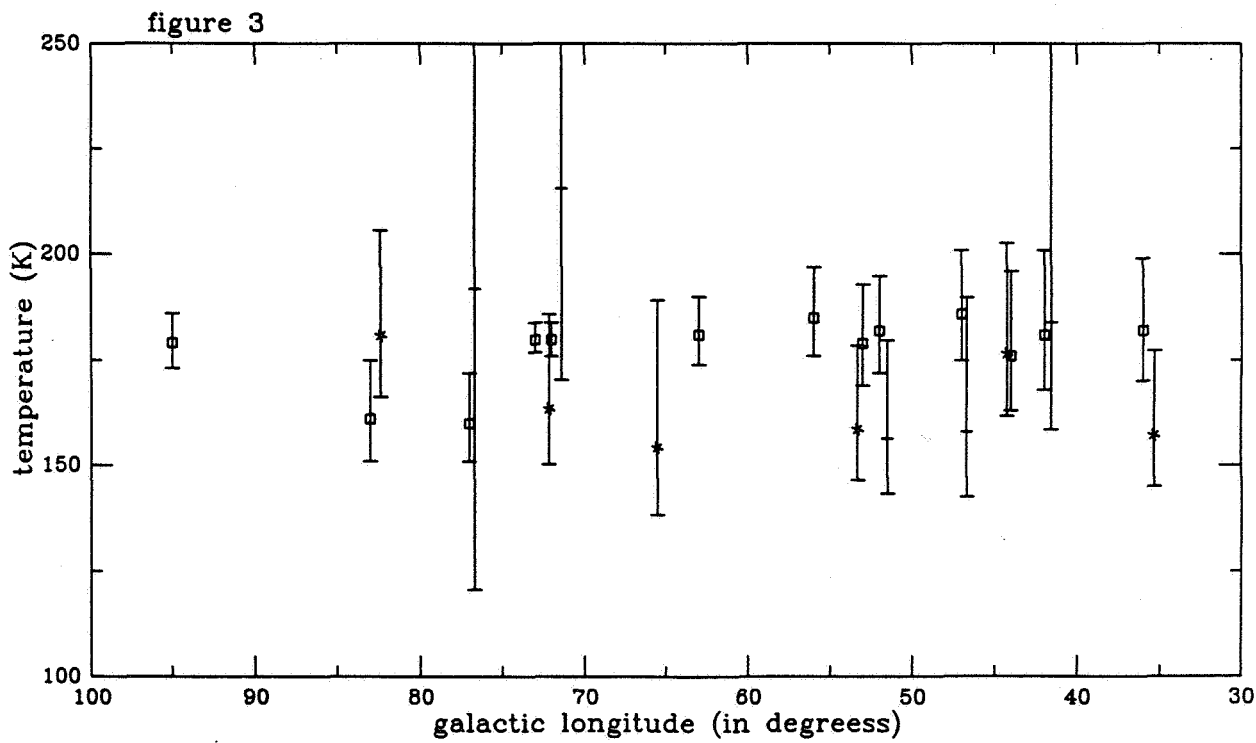
*Discontinuity  
Delta lambda lambda / lambda*



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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  $2\sigma$  indicated