

INFRARED MAPPING OF THE DUST AROUND MAIN SEQUENCE STARS

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The **photopolarimeter** on ISO (**ISOPHOT**) has been used to investigate the dust around the four prototype vega-like stars (Vega, Beta Pic, Alpha PsA, Epsilon Eri), and also several main-sequence candidate stars with excess infrared emission (from IRAS fluxes). A new technique was developed during the ISO mission, which fully exploited the excellent pointing accuracy of ISO, and ISOPHOT made high resolution linear scans across the discs of Vega (A0V), Beta Pic (A5V), HD169142 (A5Ve), and HD142666 (A8Ve). Vega was resolved at 60 microns, Beta Pic at 25 and 60 microns, HD142666 at 60 microns, and HD169142 was not resolved. The disc sizes and masses for Vega and Beta Pic were very similar to those found in the submm, suggesting that they do not possess a large amount of very cold dust. Several vega-like candidates were mapped at 60 and 90 microns to investigate the spatial extent of the dust around them. The disc around Epsilon Eri (K2V) was resolved at 90 microns, but not resolved at 60 microns.

Additionally, ISOPHOT was used to determine flux densities of the prototypes and candidates, from 5 microns to 200 microns, so that the temperature and emissivity law for the cool dust emission can be determined. Many basic stellar parameters have been improved since IRAS, due to modeling and new Hipparcos distances. These data, when combined with the spatial information, gave dust masses for the discs. The observations with the low-resolution spectrometer in ISOPHOT gave an indication of the type of dust, usually silicate dust or PAH emission, or both. The results confirmed the cool, tenuous discs around the vega-like prototypes, with dust masses which were most easily expressed in terms of the lunar mass. The other stars, which are in some cases obviously younger than Vega or Beta Pic, had larger 'disc' sizes and larger masses, ranging up to the size of Young Stellar Object disc sizes of thousands of Astronomical Units across. Hopefully, this range of sizes/masses/ages can give some insight as to how the discs around stars like Vega dissipated, as the stars grew older on the main sequence.