



Sources of the Zodiacal Cloud

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The source of the Zodiacal Cloud has been debated for years. We know from observations that it must have an asteroidal as well as a cometary component. The cometary component is needed to match the broad, high inclination component of the background cloud. The asteroidal component is needed to match the sharper, low inclination peak of the background cloud, as well as the observed dust bands. The asteroidal family component is linked dynamically to the dust bands, which were discovered by IRAS (Low et al., 1984). The dust bands are the high frequency component superimposed on the broad low frequency background of the cloud. The dust bands are not only known to be asteroidal, but are linked to specific asteroid families and can be modeled using the dynamical evolution of the dust particles resulting from the breakups of these families. The dust bands only exist outside 2 AU, due to the secular resonance at 2AU dispersing the particles in to the background cloud. The asteroidal family dust, however, extends inward to the sun, so the dust bands represent only a fraction of the dust contributed to the cloud by the asteroid families associated with them; yet the modeling of these bands allows the constraint of parameters such that the asteroidal family component can be extended inwards to determine how much dust the families contribute to the Zodiacal Cloud. The parameters constrained are the distribution of cross-sectional area with semi-major axis a , the size-frequency distribution q , and the total area contributed by each family to the dust bands. Using these parameters, we can extend the model inward to determine the magnitude of the asteroidal family component of the cloud. The 10° band and central band are known to be associated with the Veritas family and Karin cluster of the Koronis family, respectively. We will present models of these bands, as well as a potential new dust band at $\sim 15^\circ$ and possible family sources for this band. Using the comparison of our current models with IRAS (Infrared Astronomical Satellite) observations, we present our current values for the parameters and a preliminary estimate of the asteroidal component of the cloud.