

On the Symmetry Plane of the Zodiacal Dust Cloud

S. M. Kwon¹, S. S. Hong², C. Lee², J. L. Weinberg³

¹*Department of Science Education, Kangwon National University*

²*Astronomy Program, SEES, Seoul National University*

³*Space Astronomy Laboratory, Snellville, GA 30039, U.S.A.*

In order to locate the plane of maximum interplanetary dust (IPD) density, we have determined the ecliptic longitude, Ω , of the symmetry plane ascending node and the inclination angle, i , of the plane by analyzing the Milky Way East (MWE) and Milky Way West (MWW) scan data of the Hawaii night sky photo-polarimetric observations (Weinberg & Mann 1968). The MWE and MWW scans have covered the solar elongation from 20° and 50° , where the zodiacal light (ZL) is much brighter than any other sources. Because of this advantage it is easy to locate the plane of the maximum brightness. On the other hand, annual variations of both the difference in the zodiacal emission (ZE) brightness between the north and south ecliptic poles and the ecliptic latitude of the peak brightness also enable us to locate the symmetry plane. For this analysis we have utilized the IRAS zodiacal observations history file (ZOHF) data.

The parameters Ω and i obtained from the visible ZL were compared with those from the ZOHF. We also thoroughly compared some of the previous results, and discussed a significance of the differences among them. From the comparison, we found that the values of Ω and i depend on the data chosen and the deduction method. This conflicting situation was interpreted as an indication of warped nature for the maximum density surface. We propose that, in order to locate the symmetry plane accurately, it is worthwhile to carefully analyze many sets of data obtained at different seasons. An accurate set of the symmetry plane parameters would comprise an ideal criterion for building morphological models of the IPD cloud complexes.