Separation of the Atmospheric and Galactic Components from the Observed Night Sky Polarization

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One of the most difficult step in reducing the zodiacal component from the observed night sky polarization is to correct for contaminations due to the atmospheric scattering and the intrinsic polarization in the diffuse Galactic light. By analyzing the monitoring data of the night sky polarization at the north celestial pole, Hong et al. (2003) devised a method for locating polarization directions and degrees of the two contamination sources at the pole.

This method is generalized and applied, in this paper, to the all sky distribution of the night sky polarization obtained by Lee (2001). We present how the directions and degrees of the atmospheric and Galactic polarizations are distributed over the entire ranges of altitude and azimuth. This demonstrates that the atmosphere and the diffuse Galactic light modify significantly the zodiacal light polarization while it passes through the Earth's scattering atmosphere. We will construct fine resolution maps for the polarization direction and polarized brightness of the zodiacal light over ± 30 degrees in ecliptic latitude and 30 to 330 degrees in ecliptic longitude.