

Polarization and the Dust Properties in Comets

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Polarization of the light scattered from cometary dust conveys potentially important clues about the nature of the dust. Systematics in the optical polarizations of comets have been reported and suggest that these bodies can be divided into discrete classes based on the linear, large-angle polarization. If true, this would be a most valuable and interesting result, since it would allow us to study variations in the dust properties with orbital characteristics (e.g. long period vs. Jupiter family) and with formation location.

Unfortunately, a non-negligible fraction of the published polarization measurements is based on broadband filter data, in which light scattered from dust is mixed with light scattered from molecules by resonance fluorescence. Physical interpretation of such data is at best difficult and, in many cases, impossible. It is possible that the reported dust polarization systematics in comets are artifacts of molecular band contamination of the polarization signals. For this reason, we have started a program of measurements from Mauna Kea that uses only observations taken at high angular resolution through narrowband, continuum-isolating filters [1]. We will discuss the first results from this program.

References

- [1] D. Jewitt (2004). Looking Through the HIPPO: The Nucleus and Coma of 2P/Encke, *Astronomical Journal*, 128, 3061-3069.