

Modeling Tthe Polarisation Properties of Comet Levy1990XX using a Mixture of Aggregates

DIPANKAR PAUL¹, ABINASH SUKLABAIDYA¹, SUJIT R. DAS¹, HIMADRI S. DAS¹
AND ASOKE K. SEN¹

¹*Department of Physics, Assam University Silchar 788011, India*
dippaul_99@rediffmail.com Phone: +91-9401275174

Light scattering properties of cometary dust can give important information about the early solar system. We propose a model which assumes the cometary dust as a mixture of aggregates. Here, aggregates correspond to more porous Ballistic Particle-Cluster Aggregates(BPCA) and Ballistic Cluster-Cluster Aggregates (BCCA); and more compact Ballistic Agglomeration with one Migration (BAM1) and Ballistic Agglomeration with two migration (BAM2). A systematic calculation is done for different mixing ratio, different compositions (e.g., silicates, carbonaceous etc.) and wide size ranges of the particles. It is found from our analysis that mixing of aggregates with different porosity can be a better explanation for observed polarization properties of different comets. Here, the observed linear polarization data of comet Levy 1990XX at $\lambda = 0.485\mu\text{m}$ is studied using the Superposition T-matrix code. Our model successfully reproduced the polarization curve obtained for comet Levy 1990XX.

Key words : comets: general; dust; extinction; scattering; polarization; aggregates.