

MONTE-CARLO SIMULATION OF THE DIURNAL EVOLUTION OF A DUST JET IN COMET HALE-BOPP (C/1995 01)

Z. SEKANINA

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif., U.S.A.

A Monte Carlo computer code for simulating dust features in comets is applied to comet **Hale-Bopp** to model the diurnal evolution of a bright jet observed in late February 1997 to point in the southwesterly direction from the nucleus. The jet's morphology is closely matched by a model, which is based on the assumption that the ejects were released nearly continuously from **an** isolated source on **the** nucleus surface. The fitted characteristics include the initial direction of the ejects's motion, the feature's overall dimensions and shape, and its temporal variations during the rotation cycle. In particular, it is found that the relatively faint appendix some 10 to 15 arcsec directly to the south from the nucleus can be identified **with** the residual ejects from the previous rotation cycle. No attempt has been made to fit the observed brightness changes, which are strongly affected by variable seeing, especially in daylight. It is also shown that if the system of concentric halos to the south from the nucleus consists of two independent branches, its southwesterly branch can be identified with the ejects from the same jet that are several rotations old. **Modelling** of a jet's diurnal evolution presents a very powerful tool in our quest for understanding the problem of dust emission from discrete active regions on cometary nuclei.