

Dynamical evolution of dust particles: from comets to the inner solar system

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There have been a long-standing debate regarding origins of interplanetary dust particles. Recent research about the optical properties and spatial distribution of zodiacal light suggested that ~ 90% of interplanetary dust particles which comprise the zodiacal light would be originated from comets. In this work, we started from different point of view. We studied the final status of dust cloud made by the dust particles ejected from comets. We chose representative comets which cover a wide variety of cometary orbital distribution. Hypothetical dust particles with different sizes were ejected from selected actual comets, following a dust ejection model based on cometary observations. We performed a numerical integration of dust orbits involving photon drag from solar radiation and perturbations from planetary gravitation. In this presentation, we will introduce our results about final positions of the cometary dust particles, and compare it with the observed quantities of interplanetary dust particles in the inner solar system, that is, the mass budget, size-frequency distribution, orbital elements distribution and zodiacal light brightness distribution.

Keywords: interplanetary dust particles, comets, zodiacal cloud, numerical simulation