Geophysical Research Abstracts, Vol. 9, 10863, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-10863

Dynamical evolution of asteroidal dust particles and their orbital element distribution in near-Earth space

T. J. J. Kehoe, S. F. Dermott, A. J. Espy

Department of Astronomy, University of Florida, Gainesville, Florida, U.S.A.
(kehoe@astro.ufl.edu)

Previous models of the distribution of asteroidal dust in the inner solar system have typically been limited to considering small particles ($<$ 100 microns in diameter) because of their shorter Poynting-Robertson (P-R) drag timescales and hence shorter integration times. With the advance in readily available processing power and the introduction of efficient new numerical techniques, these computational restrictions have now been significantly reduced. Here, we present results from an ongoing investigation into the dynamical behavior of a more realistic size distribution of asteroidal dust particles (up to 1,000 microns in diameter). These simulations have shown that, in contrast to the behaviour of small particles, the orbits of large asteroidal particles ($>$ 100 microns in diameter) are significantly affected by both jovian mean-motion resonances and secular resonances as they slowly decay towards the Sun under the effect of P-R drag. As a consequence of their passage through these resonances, the eccentricities and inclinations of the large dust particles are markedly increased, with the result that the division between asteroidal- and cometary-type orbits in the inner solar system becomes obscured. We consider the implications of this result for models of the dust environment in near-Earth space.