

[KASS-05] Consideration of a Circumsolar Dust Ring in Resonant Lock with the Venus

Jeong Jinhoon, Masateru Ishiguro
Seoul National University

Interplanetary space is filled with dust particles originating mainly from comets and asteroids. Such interplanetary dust particles lose their angular momentum by solar radiation pressure, causing the dust grains to slowly spiral inward (Poynting–Robertson effect). As dust particles move into the Sun under the influence of Poynting–Robertson drag force, they may encounter regions of resonance just outside planetary orbits, and be trapped by their gravities, forming the density enhancements in the dust cloud (circumsolar resonance ring). The circumsolar resonance ring near the Earth orbit was detected in the zodiacal cloud through observations of infrared space telescopes. So far, there is no observational evidence other than Earth because of the detection difficulty from Earth bounded orbit. A Venus Climate Orbiter, AKATSUKI, will provide a unique opportunity to study the Venusian resonance ring. It equips a near-infrared camera for the observations of the zodiacal light during the cruising phase. Here we consider whether Venus gravity produces the circumsolar resonance ring around the orbit. We thus perform the dynamical simulation of micron-sized dust particles released outside the Earth orbit. We consider solar radiation pressure, solar gravity, and planetary perturbations. It is found that about 40 % of the dust particles passing through the Venus orbit are trapped by the gravity. Based on the simulation, we estimate the brightness of the Venusian resonance ring from AKATSUKI's locations.
