P154-007 **Room: 201B** **Time: May 16 10:18-10:30**

Dependence of Vega-type dust disk structure on the particle size

Takayuki Doi[1]; # Taku Takeuchi[2]

[1] Earth and Planetary Sci., Kobe Univ; [2] Kobe Univ.

Some Vega-type stars show ring-like or clumpy structures in their disks. Such structures possibly have formed under the influence of the gravity of unseen planets. We investigate how the disk structure varies with the dust particle size. Variation in the particle size leads to a change in the relative strength of the radiation force to the gravity of the central star, and consequently results in a different structure. We solved the restricted three-body problem and calculated the orbit of a dust particle under the gravity of the central star and the planet and the radiation force from the star. After 1000 runs for each particle size, we calculated the disk structure from the orbits of 1000 particles.

We assumed that the planet's mass is an earth mass and its orbit is circular at 1 AU. Initial distance of the dust particle is 2 AU from the star, and the initial longitude is varied for 1000 particles. The particle falls toward the star because of the Poynting-Robertson (PR) drag until it is captured by a mean motion resonance (MMR). We calculated the capture probability and the mean capture time for each resonance. Using the calculated orbits of 1000 particles, we obtained an expected structure of the dust disk. Numerical integration is done by the 4th-order alpha-Hermite scheme (Kokubo & Makino, 2004).

Smaller particles experience stronger PR drag and have larger falling velocities. The number of disk clumps increases for smaller particles because they are captured in resonances closer to the planet. For a particle of 1 micrometer (the ratio of the radiation pressure to the gravity, beta=0.3), it is mostly captured in the 5:4 resonance at 1.03AU, making 4 clumps. For a particle of 30 micrometer (beta=0.01), it is mostly captured in the 3:2 resonance at 1.3AU, making 2 clumps. The mean capture time is larger for particles captured in resonances farther from the planet.