

Disk-Planet Interaction and Planet Formation

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We examine the net torque on a planet and the resultant radial migration of the planet. We calculate the torques of Lindblad resonances and of corotation resonances in three-dimensional isothermal disks. In 3D disks, the differential Lindblad torques are generally smaller than those in 2D disks. As a result, the migration time of planets increases by the factor 2 or 3 compared with the result of 2D calculation, which is of the order of million years for earth-size planet at 5AU for a typical disk model. The reflected waves from disk edges can further weaken the disk-planet interaction.