

The Structure of the Circumbinary Disk around the Eccentric Binary

Yusuke Imaeda[1], Shu-ichiro Inutsuka[2]

[1] NAOJ, ADAC, [2] Physics Dept.

Kyoto Univ.

Observation shows that most stars are the members of the binary stars or the multiple stars. In addition, most binaries have significantly large orbital eccentricity. Theoretically speaking, the disk-like structures are naturally formed around the binary stars when the binaries are born. These disks are called as circumstellar disks and circumbinary disks, and a few observations shows the existence of these disk structures.

We investigate the long-term interaction between the eccentric binary and the circumbinary disk. Since the eccentric binary has the steady octupole moment in its gravitational potential, it makes the orbit of the gas disk eccentric. On the other hand, it also has the steady quadrupole moment, which rotate the longitude of periastron in the precession timescale. The combination of these two gravitational moments leads the recursive eccentricity growth and damp. However, if we consider the viscous effect in the disk, the libration of the orbit becomes small, and final steady state can be obtained. We discuss this final steady state precisely.