U054-P017 **Room: Poster Session Hall** **Time: May 14**

Vertical structure of accretion disks in dynamical and thermodynamical steady state

Shigenobu Hirose[1]

[1] ESC/JAMSTEC

In spite of its great importance, the vertical structure of accretion disks, which corresponds to the radial structure of stars, has not been obtained yet in an accurate way because the detail of energy source of accretion disks has been unclear. More particularly speaking, the gravitational energy of the accreting gas is known to be the ultimate energy source, but how it finally dissipates to heat the accretion disk has been the puzzle. For example, usual molecular viscosity is too small to explain observed energy release rates. Recently, magnetohydrodynamic (MHD) turbulence driven by magnetorotational instability is found to be a possible candidate of such energy dissipation mechanism. Therefore, now the path toward computing the vertical structure of accretion disks from the first principle has been laid out; that is, track the dissipation of MHD turbulence; relate heat injection to photon production; compute photon transfer to the disk surface. In this paper, we show the results of following this path by using 3D radiation MHD simulation; we simulate a shearing-box section of an accretion disk and suppose that the dissipated energy is transformed into local heating, and then solve the radiation transfer problem in the flux-limited diffusion approximation. When the system reaches a dynamical and thermodynamical steady state in a statistical sense, we are able to find the vertical profiles of physical quantities by taking horizontal and temporal averages. We also discuss the character of fluctuations, both spatial and temporal, in the system.