Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Irregular singularity of the magneto-rotational instability in a Keplerian disk. M. FURUKAWA, Z. YOSHIDA, M. HIROTA, V. KRISHAN, Grad. Sch. Frontier Sci., Univ. Tokyo, Japan — Magneto-rotational instabilities in a Keplerian disk are studied via both the eigenvalue and initial-value approaches on the basis of the incompressible magnetohydrodynamics model. The center of the Keplerian disk is an irregular singularity for the eigenfunctions of the magneto-rotational instabilities. This singularity yields continuous eigenvalues (growth rates in the unstable regime and frequencies in the stable regime). The eigenfunctions belonging to the continuum are square-integrable and are not orthogonal with each other. Physical implications of such a continuum and the eigenfunctions are rather complex, because of the "non- Hermitian" nature of the rotating plasma system. Invoking the Laplace transform, as well as numerical simulations, interesting long-term behavior of the instability, or the slow change of the mode structure in the exponentially growing phase, has been found.

Masaru Furukawa
Grad. Sch. Frontier Sci., Univ. Tokyo, Japan

Date submitted: 20 Jul 2006 Electronic form version 1.4