## [구IM-13] Regulation of Star Formation Rates in Multiphase Galactic Disks: Numerical Tests of the Thermal/Dynamical Equilibrium Model

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Using two-dimensional numerical hydrodynamic simulations, we investigate the regulation of star ormation rates in turbulent, multiphase, galactic gaseous disks. Our simulation domain is xisymmetric, and local in the radial direction and global in the vertical direction. Our models nclude galactic rotation, vertical stratification, self-gravity, heating and cooling, and thermal onduction. Turbulence in our models is driven by momentum feedback from supernova events ccurring in localized dense regions formed by thermal and gravitational instabilities. Self-onsistent radiative heating, representing enhanced/reduced FUV photons from the star formation, s also taken into account. Evolution of our model disks is highly dynamic, but reaches a quasi-teady state. The disks are overall in effective hydrostatic equilibrium with the midplane thermal ressure set by the vertical gravity. The star formation rate is found to be proportional pproximately linearly to the midplane thermal pressure. These results are in good agreement with the predictions of a recent theory by Ostriker, McKee, and Leroy (2010) for the thermal/dynamic equilibrium model of star formation regulation.

## [구IM-14] MHD turbulence in expanding/collapsing media

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We investigate driven magnetohydrodynamic (MHD) turbulence by including the effects of expansion and collapse of background medium. The main goal is to quantify the evolution and saturation of strength and characteristic lengths of magnetic fields in expanding and collapsing media. Our findings are as follows. First, with expansion and collapse of background medium, the magnetic energy density per comoving volume does not saturate; either it keeps decreasing or increasing with time. The magnetic energy density relative to the kinetic energy density strongly depends on the expanding or collapsing rate. Second, at scales close to the energy injection (or driving) scale, the slope of magnetic field power spectrum shallows with expansion but steepens with collapse. Third, various characteristic lengths, relative to the energy injection scale, decrease with expansion but increase with collapse. We discuss the astrophysical implications of our findings.