[구IM-03] Regulation of Star Formation in Turbulent, Multiphase Interstellar Media

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Using two-dimensional numerical hydrodynamic simulations, we investigate the star formation rate (SFR) in turbulent, multiphase, galactic gaseous disks. Our simulation domain is axisymmetric, and local in the radial direction and global in the vertical direction. Our models include galactic rotation, vertical density stratification, self-gravity, radiative heating and cooling, and thermal conduction, but do not include spiral-arm features. Turbulence in our models is driven by momentum feedback from supernova explosion events occurring in localized dense regions formed by thermal and gravitational instabilities. Self-consistent radiative heating, representing enhanced/reduced FUV photons from the star formation, is also taken into account. By controlling three parameters (the gas surface density, the stellar disk density, and the angular rotation rate) that characterize local galactic disks, we explore how the SFR depends on the background environmental state. We also discuss the relation between the SFR and the gas surface density found in our numerical models in comparison with observations. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (MEST), No. 2009-0063616.

[구IM-04] Properties of Interstellar Turbulence in Galactic Ring Survey

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We have studied the properties of interstellar turbulence as observed by Boston University-Five College Radio Astronomy Observatory (BU-FCRAO) Galactic Ring Survey (GRS). This observation uses 13CO J = 1 → 0 emission with high spectral resolution of 0.21 kms-1 and covers wide galactic plane regions ($18^\circ < l < 55.7^\circ$ and $-1 < b < 1^\circ$). Firstly, we measured the one dimensional power spectrum of 13CO intensity along the galactic longitude and along the galactic latitude. We found the slope of the power spectrum changes around the molecular ring structure and the center of the galactic plane. Secondly, we explored how the power spectral slope is related with the velocity dispersion of supersonic giant molecular clouds in the GRS. Finally, we suggest the turbulent nature of the interstellar medium is connected with star formation activities in spiral arms.