[구IM-09] Comparing the statistics of isothermal compressible turbulence in simulation : Single versus Double forcing

Hyunju,Yoo, Jungyeon Cho
Department of Astronomy and Space science, Chungnam National University

Turbulence is ubiquitous in astrophysical fluids such as the interstellar medium(ISM) and the intracluster medium(ICM). There are many driving mechanisms which can inject energy into the fluid in variety driving scales, But the plausible driving scale of ISM/ICM turbulence are yet unknown. Therefore, understanding different statistical properties between turbulence with single driving scale and turbulence with double driving scale is required. In this work, we performed 3-dimensional isothermal compressible, magnetohydrodynamic(MHD) turbulence simulations. We drive turbulence in the Fourier space in two ranges, 2<k<3(large scale) and 15<k<26(small scale). We injected different amount of energies by changing the amplitudes of forcing in these ranges. We present time evolution of kinetic and magnetic energy densities and spectra of density, kinetic and magnetic fields. We also examine density probability distribution function(PDF) and make statistical analysis.

[구IM-10] A Scaling of Velocity and Magnetic field in Decaying Turbulence in Expanding/Collapsing Media

Junseong Park, Dongsu Ryu, Jungyeon Cho
Department of Astronomy and Space Science, Chungnam National University, Daejeon, Korea

We investigate decaying magnetohydrodynamic (MHD) turbulence by including the effects of expansion and collapse of the background medium. The problem has two time scales, the eddy turn-over time(t_{eddy}) and the expansion/collapse time scale(τ_H). The turbulence is expected to behave differently in two regimes of $t_{eddy} < \tau_H$ and $t_{eddy} > \tau_H$. For instance, for $t_{eddy} < \tau_H$, the turbulence would decay more or less as in a static medium. On the other hand, for $t_{eddy} > \tau_H$, the effects of expansion and collapse would be dominant. We examine the properties of turbulence in the regimes of $t_{eddy} < \tau_H$ and $t_{eddy} > \tau_H$. Based on it, we derive a scaling for the time evolution of flow velocity and magnetic field.