Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Direct numerical and large eddy simulations of decaying magnetohydrodynamic turbulence at low magnetic Reynolds number ABHILASH CHANDY, University of Akron, STEVEN FRANKEL, Purdue University — A series of direct numerical simulations (DNS) is performed for decaying homogeneous magnetohydrodynamic (MHD) turbulence at low magnetic Reynolds number ($Re_m << 1$) with different strengths of magnetic field. The initially-isotropic turbulence problem has a Taylor scale Reynolds number (Re_λ) of 220. Comparisons of decay rates, energy spectra and even higher-order statistics such as structure functions and skewness factors are made between the varying magnetic field cases. Furthermore, the phenomenon of anisotropy, that is developed due to the introduction of the magnetic field is investigated by comparing anisotropy coefficients based on velocities and their gradients. Large eddy simulations (LES) using the classical non-dynamic Smagorinsky model are also conducted for the highest magnetic field case and results are in excellent agreement with the corresponding DNS.

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Date submitted: 03 Aug 2009 Electronic form version 1.4