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Session 4Q - Turbulence and Chaos.

POSTER session, Tuesday afternoon, November 12

Exhibit Hall - Concourse Level, Adam's Mark

**[4Q.32] Weakly Compressible and Anisotropic MHD
Turbulence in the Solar Wind and the Interstellar Medium**

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Turbulent plasmas in the solar wind and the interstellar medium often contain a large directed magnetic field with plasma beta (β) of the order unity. Such a background magnetic field is thought to make the turbulence weakly compressible and anisotropic. Numerical simulations are performed on a system of reduced equations, derived from the fully compressible MHD equations, which involve four field variables: the magnetic flux, vorticity, pressure and parallel flow. If $\beta \ll 1$, these equations reduced to the well known Rosenbluth-Strauss (or RMHD) equations which are incompressible. However, for a general equilibrium with $\beta \sim 1$, the effect of compressibility is shown to enter at the leading order. For weak anisotropic MHD turbulence dominated by three-wave interactions between oppositely propagating Alfvén wave packets, the spectral index of the interactions is calculated analytically and numerically based on the RMHD equations. A new relation is derived between this index and the spectral indices of two random-amplitude wave packets. This relation implies an anisotropic energy spectrum that differs significantly from the Iroshnikov-Kraichnan spectrum. ^{Work supported by NSF and AFOSR.}

■ **Part 4 of program listing**