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The density fluctuation spectrum in the solar wind plasma[1] DASTGEER SHAIKH, G.P. ZANK, Department of Physics and Center for Space Plasma and Aeronomic Research (CSPAR) — The density fluctuation spectrum in the solar wind reveals a Kolmogorov-like scaling with a spectral slope of -5/3 in wavenumber space. The energy transfer process in the magnetized solar wind, characterized typically by magnetohydrodynamic turbulence, over extended length-scales remains an unresolved paradox of modern turbulence theories, raising the question of how a compressible magnetofluid exhibits a turbulent spectrum that is a characteristic of an incompressible hydrodynamic fluid. To address these questions, we have undertaken three-dimensional time-dependent numerical simulations of a compressible magnetohydrodynamic fluid describing super-Alfvénic, supersonic and strongly magnetized plasma fluid. It is shown that a Kolmogorov-like density spectrum can develop by plasma motions that are dominated by Alfvénic cascades whereas compressive modes are dissipated.

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