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A paradigmatic flow for small-scale MHD and the collision of current sheets[1] ANNICK POUQUET, National Center for Atmospheric Research, ED LEE, NCAR, PABLO MININNI, Universidad de Buenos Aires, MARC-ETIENNE BRACHET, ENS, Paris, DUANE ROSENBERG, NCAR, TNT/IMAGE TEAM, COLUMBIA UNIVERSITY TEAM — We propose a new flow in which the velocity and magnetic fields have symmetries that are preserved by the dynamical equations, allowing for substantial savings in CPU time and memory for a given Reynolds number when implemented numerically. Basic properties of this Taylor-Green flow generalized to MHD are studied up to a 2048**3 grid point equivalent. The temporal evolution of the logarithmic decrement of the energy spectrum remains exponential with no sign of singularity in the ideal case; at the highest resolution, an acceleration corresponding to the near collision of two current sheets driven together by magnetic pressure, with a fast rotation of the direction of the magnetic field is seen, a feature also observed in the solar wind. With dissipation at a unit magnetic Prandtl number, statistical properties of the decaying case are analyzed after averaging over a sizable time interval during which the flow is stationary. An investigation of energy spectra gives a clear tendency toward anisotropic weak MHD turbulence.

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