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Energy interactions in homogeneously sheared magnetohydrodynamic flows DIANE COLLARD, Kansas State University, DIVYA SRI PRATURI, SHARATH GIRIMAJI, Texas AM Univ — We investigate the behavior of homogeneously sheared magnetohydrodynamic (MHD) flows subject to perturbations in various directions. We perform rapid distortion theory (RDT) analysis and direct numerical simulations (DNS) to examine the interplay between magnetic, kinetic, and internal energies. For perturbation wavevectors oriented along the spanwise direction, RDT analysis shows that the magnetic and velocity fields are decoupled. In the case of streamwise wavevectors, the magnetic and velocity fields are tightly coupled. The coupling is "harmonic" in nature. DNS is then used to confirm the RDT findings. Computations of spanwise perturbations indeed exhibit behavior that is impervious to the magnetic field. Computed streamwise perturbations exhibit oscillatory evolution of kinetic and magnetic energies for low magnetic field strength. As the strength of magnetic field increases, the oscillatory behavior intensifies even as the energy magnitude decays, indicating strong stabilization.

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