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Transition from hydro to magnetohydrodynamics turbulence in a von Kármán flow JEAN-FRANCOIS PINTON, GAUTIER VERHILLE, NICOLAS PLIHON, ENS de Lyon, RUSLAN KHALILOV, PETER FRICK — We report on how how an externally applied magnetic field modifies turbulence in a von Karman(VK) swirling flows. Time resolved measurements concern global variables (such as theflow power consumption) and local recordings of the induced magnetic field. From these measurements, we introduce an effective Reynolds number which takes into account changes in the interaction parameter N, as Rm_{eff} = Rm(1 - α N). This definition of the effective magnetic Reynolds number leads to unified scalings for both the global variable and the local induced magnetic field. In addition, when the flow rotation axis is perpendicular to the direction of the applied magnetic field, we observe significant flow and induced magnetic field fluctuations at low interaction parameter values, but corresponding to an Alfven speed V_A of the order of the fluid velocity fluctuations u_{rms}. This strong increase in the flow fluctuations is attributed to chaotic changes between hydrodynamics and magnetohydrodynamics velocity profiles.

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