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Asymptotics for magnetostrophic turbulence in the Earth's fluid core

We consider the three dimensional magnetohydrodynamics (MHD) equations in the presence of stochastic forcing as a model for magnetostrophic turbulence. For scales relevant to the Earth's fluid core this MHD system is very rich in small parameters. We discuss results concerning the asymptotics of the stochastically forced PDEs in the limit of vanishing parameters. In particular we establish that the system sustains ergodic statistically steady states thus providing a rigorous foundation for magnetostrophic turbulence.

This is joint work with Juraj Foldes, Nathan Glatt-Holtz and Geordie Richards.