

A project for a turbulent dynamo experiment with scale separation

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It has been reported in several numerical studies that large scale turbulent fluctuations can inhibit dynamo action. It is believed that this effect has prevented the observation of a dynamo in experiments with non constrained flows. We have recently shown that the increase of the dynamo threshold due to turbulent fluctuations almost disappears in the case of scale separation, i.e. when the flow is forced at small scale compared to the one at which the magnetic field can grow (see Sadek et al. (2016), Phys. Rev. Lett. 116, 074501). We will present an experimental set-up that will take profit of this observation in order to achieve a turbulent dynamo. We will then discuss some open questions that could be studied using this experiment. In particular, it will be possible to test the validity of some large scale turbulent flow modeling (see Prasath et al.(2014), Europhys. Lett. 106, 29002).
