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Taylor-Couette dynamo CHRISTOPHE GISSINGER, Princeton University — Dynamo action is a mechanism by which a magnetic field is self generated by the turbulent flow of an electrically conducting fluid. It is believed to be responsible for the magnetic field of many astrophysical objects. However, a lot of questions remain concerning the generation of fluid dynamos, in particular when the flow is strongly turbulent. On the other hand, Taylor-Couette flow is one of the most studied problem in fluids dynamics, with an abundant literature describing flow patterns, dynamical regimes, or the transition to turbulence as Re is increased. Surprisingly, only a few numerical work has been done on Taylor-Couette dynamo. I will present results of 3D direct numerical simulations of the magnetic field generated by a Taylor-Couette flow. I investigate the effect of turbulent fluctuations on the threshold of the dynamo and study the dynamical regimes obtained in the saturated state, depending on the flow patterns. Different configurations are explored, by varying the geometry of the cylinders, the rotation ratio and the magnetic boundary conditions. Finally, I describe the interaction between the dynamo magnetic field and the MagnetoRotational Instability (MRI) occurring in this simple Taylor-Couette configuration.

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