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Numerical simulations of magneto-rotational turbulence in cylindrical geometry.[1] FAUSTO CATTANEO, University of Chicago / Argonne National Laboratory, PAUL FISCHER, Argonne National Laboratory, ALEKSANDR OBABKO, University of Chicago — We present numerical simulations of magneto-rotational flows in cylindrical Couette geometry. To the best of our knowledge these simulations are the most highly resolved in this geometry to date. We study regimes in which the magneto-rotational instability is strongly supercritical, and its nonlinear evolution leads to the development of turbulence. We show that in these regimes, the flows act as efficient dynamos and the turbulence persists even in the absence of an externally imposed magnetic field. The mechanism responsible for the saturation amplitude of the turbulence involves both an increase in dissipation and a modification of the background rotational profile. The angular momentum transport is mostly by the Maxwell stresses, and is enhanced from its collisional value by a factor of the order the Reynolds number of the fluctuating velocity.

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