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Magneto-rotational instability and turbulent angular momentum transport[1] ALEKSANDR OBABKO, FAUSTO CATTANEO, University of Chicago, PAUL FISCHER, Argonne National Lab — We present numerical simulations of magnetized-Couette flow between concentric rotating cylinders in axisymmetric and fully three-dimensional geometry. This work complements the Princeton liquid gallium experiment by Goodman and Ji to study the nonlinear development of the Magneto-Rotational Instability (MRI). The simulations are carried out with a spectral element code incorporating realistic hydro boundary conditions at the upper and lower boundaries and consisting of differentially rotating rings. These conditions were chosen in the experimental setup so as to minimize the effects of Ekman circulations thereby exposing the MRI in its cleanest form. Changes in the flow structure and in the mechanism for angular momentum transport in the magnetic and non-magnetic cases will be discussed as well as the impact of upper and lower boundary conditions (periodic vs. finite container).

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