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Magnetorotational instability in electrically driven flow: theoretical predictions and experimental observations[1] IVAN KHALZOV, ANDREI SMOLYAKOV, University of Saskatchewan, VICTOR ILGISONIS, RRC Kurchatov Institute — The electrically driven flow of liquid metal in circular channel is efficient way to test magnetorotational instability (MRI) in laboratory. The main body of this flow has the equilibrium rotation law $\Omega(r) \propto 1/r^2$, which is stable hydrodynamically but can be unstable with respect to MRI. We study numerically the linear stability of such flow in the circular channel of finite hight in the presence of vertical magnetic field in the frame of dissipative incompressible magnetohydrodynamics (MHD). Marginal stability curves in the plane Hartmann number – Reynolds number are calculated for the range of azimuthal wave-numbers $m = 0 \div 200$. It is shown that for larger Hartmann numbers the threshold of instability is determined by modes with higher m. Our numerical results are found to be in a good agreement with available experimental data.

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