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Global Rotational Instabilities with Vertical Field Reversal JESSE PINO, SWADESH MAHAJAN, Institute for Fusion Studies, The University of Texas at Austin, ZEHUI WANG, Los Alamos National Lab — Attempts to observe the Magnetorotational Instability in many laboratory experiments are complicated by turbulence due to the low magnetic Prandtl number ($Pm \equiv \nu/\eta$) of liquid metals. Recent experiments in the Los Alamos Flowing Magnetized Plasma (FMP) facility have shown that it is possible to sustain quasisteady rotation in a plasma annulus with $Pm > 1$. The plasma is supported by a rotational current drive, which can reverse the direction of the magnetic field in the interior. We examine the global linear stability of an idealized system in which a centrifugally supported plasma with differential toroidal rotation is threaded by a vertical field $B_z(r)$ which reverses sign in the interior of the plasma. A toroidal field $B_\phi \sim 1/r$ is also present. We find the necessary parameters for the excitation of the MRI. The effects of temperature and density gradients are also considered, as well as Hall terms. Consequences for the nonlinear regime are discussed.

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