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**Nonlinear error field response in the presence of plasma rotation and real frequencies due to favorable curvature**[1] JOHN FINN, CIHAN AKCAY, Tibbar Plasma Technologies, ANDREW COLE, Columbia University, DYLAN BRENNAN, Princeton University — We present NL NIMROD resistive MHD simulations of a rotating plasma with error fields for a plasma with weakly damped linear tearing modes (TM's), stabilized by favorable curvature. Favorable curvature leads to the Glasser effect, real frequencies and stabilization with positive Delta'. Hollow pressure in a cylinder models the toroidal favorable curvature. Linear simulations with rotation and an error field show, in agreement with analysis, that the peak reconnected flux occurs for rotation near the TM phase velocity. NL simulations show that the Glasser effect disappears due to a NL effect for thin islands: flattening of the pressure across the island due to sound wave propagation. This causes the disappearance of real frequencies and destabilization, allowing the mode to grow like a zero beta unstable TM. The flattening of the current for larger islands saturates the mode nonlinearly; the interaction of the error field with the rotating spontaneous tearing mode leads to oscillations in the Maxwell torque and therefore modulations in the plasma rotation. The islands also rotate with modulated phase velocity, undergoing small-amplitude oscillations due to these modulations. We present a quasilinear model with a TM, rotation and error fields, showing similar oscillations.

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