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Real frequency tearing modes with parallel dynamics and their effect on locking and resistive wall modes¹ ANDREW COLE, Columbia University, J.M. FINN, Tibbar Plasma Technologies Inc., Los Alamos NM, D.P. BRENNAN, Princeton University — Tearing modes with real frequencies in the plasma frame are of potential importance because of their effect on the locking process. In particular, it has recently been shown [1] that the Maxwell torque on the plasma in the presence of an applied error field is modified significantly for tearing modes having real frequencies near marginal stability. In this poster we derive the tearing mode dispersion relation with pressure gradient, field line curvature and parallel dynamics in the resistive-inertial (RI) and visco-resistive regimes, neglecting the divergence of the $\mathbf{E} \times \mathbf{B}$ drift and perpendicular resistivity. The results show that the usual Glasser effect, which involves real frequencies, occurs in this simplified model in both regimes. Moreover, we show that in both regimes the existence of tearing modes with complex frequencies is related to nearby electrostatic resistive interchange modes with complex frequencies. Finally, we find that the lowering of the threshold for destabilization of the resistive wall mode can be much more pronounced than observed for tearing modes in Ref. [2]. References: [1] J. M. Finn, A. J. Cole, and D. P. Brennan, PoP (Letters) 22, 120701 (2015). [2] J. M. Finn and R. A. Gerwin, PoP 3, 2344 (1996).

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