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Momentum transport from reconnection in flowing plasmas FATIMA EBRAHIMI, S.C. PRAGER, V.V. MIRNOV, C.R. SOVINEC, University of Wisconsin and Center for Magnetic Self-Organization in Lab and Astrophysical Plasmas — Magnetic fluctuations arising from MHD instabilities can cause momentum transport in both laboratory and astrophysical plasmas. We investigate, both analytically and numerically, momentum transport in force-free magnetic configurations using the Maxwell stress associated with tearing instabilities. We study transport from single tearing modes in the linear and nonlinear regimes, and transport arising from nonlinear mode coupling. Analytic quasilinear theory, based on matching of inner layer and outer region equations, shows that in the absence of equilibrium flow no momentum transport occurs, but that momentum transport accompanies tearing modes in plasma with equilibrium flow. The resistive, 3D, MHD code, DEBS, is used to evaluate transport in the full nonlinear state. An ad-hoc term is added to the momentum equation to represent a source of plasma flow, and the nonlinear flow dynamics is studied. Supported by NSF and DOE.

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