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Momentum transport from current-driven reconnection FATIMA EBRAHIMI, V.V. MIRNOV, S.C. PRAGER, University of Wisconsin and Center for Magnetic Self-Organization in Lab and Astrophysical Plasmas — In rotating toroidal plasmas in both laboratory and astrophysical settings, toroidal angular momentum is observed to be transported radially outward. In both cases the transport is much greater than can be explained by collisional viscosity. In the reversed field pinch (RFP), the toroidal rotation profile flattens abruptly during a reconnection event. Here we evaluate momentum transport that arises from current-driven reconnection, in particular from tearing instabilities in the RFP. Through quasilinear calculation of Maxwell and Reynolds stresses, we find that a single tearing mode, in the presence of equilibrium flow, can indeed produce momentum transport in the vicinity of the reconnection layer. However, nonlinear, resistive MHD computation of the full, multi-mode nonlinear dynamics reveals an additional effect. In the presence of multiple tearing modes, nonlinear coupling strongly enhances the torques and broadens their radial width. Theoretical results will be compared to the momentum transport measurements in the MST experiment. Preliminary computational results of momentum transport from current-driven reconnection in an accretion disk (a possible mechanism in addition to the transport from flow-driven instabilities) will also be reported.

Fatima Ebrahimi
University of Wisconsin

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