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Dynamic Sub-Grid Scale Modeling of Tearing Mode Interaction with Turbulence CHRISTOPHER MCDEVITT, PATRICK DIAMOND, University of California, San Diego, USA — A self-consistent treatment of both a long wave-length tearing mode and electrostatic background micro-turbulence is developed with consideration of applications to the Quasi Single Helicity (QSH) state of the RFP. Turbulent viscosities are derived for the case of homogeneous micro-turbulence as well as for micro- turbulence developing in a sheared magnetic field. A negative viscosity is found in both cases, motivating the possiblity of generation of large scale flows. The nonlinear evolution of this system is under analysis, with special emphasis on the interaction of a tearing mode with the background vortices driven via the negative viscosity. Viscoresistive magnetohydrodynamic simulations predict a transition into the QSH state for low Hartmann Numbers [1]. Comparison with estimates of experimental collisional values of the resistivity and viscosity lead to a Hartmann Number far in excess of the critical value needed to access the QSH state. While the magnitude of the viscosity is found to be enhanced by a factor of roughly two to three orders of magnitude (roughly that needed to access the QSH state), the sign is negative on large scales. This leaves the meaning of a Hartmann Number criterion for the transition to the QSH state unclear. The results of ongoing considerations of this issue will be reported. [1] S. Cappello, D.F. Escande, Phys. Rev. Lett. 85, 3838 (2000)

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