Turbulence Suppression in a coherent structure of localized current and vorticity JUHYUNG KIM, PAUL W. TERRY, Department of Physics, University of Wisconsin at Madison and CMTFO — As a prelude to studying momentum transport in the RFP we examine the quasi-single helicity state of RFX as a transport barrier. Using analytic and numerical approaches we investigate turbulence suppression by a coherent structure of localized current and vorticity with a reduced MHD model. Previously, suppression was investigated inside a localized vortex structure in 2D Navier-Stokes turbulence[1] and a localized current structure in kinetic Alfvén wave turbulence.[2] Following the previous works, the time scales of coherent structures with a flow shear and magnetic field shear and ambient turbulence are assumed to be separated and a variant of eddy-damped quasinormal Markovian (EDQNM) closure is applied to the turbulence. Qualitative criteria will be estimated for flow shear dominated, and magnetic field shear dominated suppression of turbulence. Numerical calculations will be given for comparison with the analytical estimates.

[1]P. W. Terry, D. E. Newman, and N. Mattor. *Phys. Fluids A*, 4(5):927–937, 1992.
[2]P. W. Terry and K. W. Smith. *Astrophys. J.*, 665(1):402–415, 2007.

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