On the Transition from Hydrodynamic to MHD Cascade and the Breakdown of Vorticity Homogenization L.T. KATT, P.H. DIAMOND, L. SILVERS, University of California, San Diego, S.M. TOBIAS, University of Leeds — We adress the simple question of "At what value of a weak uniform B_0 does a 2D hydrodynamic dual cascade (associated with enstrophy homogenization) convert to a 2D MHD forward energy cascade?" We approach this by calculating the gradient in vorticity within a cell or eddy (with closed streamlines) linked to an external magnetic field. Both a local and an averaged criterion are derived. The global criterion is in terms of an Hartmann nuber and is consistent with preliminary results of simulation. More interestingly, the degree of vorticity homogenization emerges as related to the topology of filed line to streamline linkage at the boundary of the cell, as well as the profile of current density on the boundary of the cell. A variety of stable configurations are shown to be possible and will be discussed.

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