Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Self-consistent evolution of a magnetic island with drift wave turbulence CHRISTOPHER MCDEVITT, PAT DIAMOND, University of California at San Diego — In this work, we treat the self-consistent evolution of a magnetic island in the presence of drift wave turbulence. As is well known, the evolution of a magnetic island, including neoclassical destabilization, depends strongly on the transport coefficients present within the magnetic island equations. Although these transport coefficients are known to have a turbulent origin, and thus will be strongly effected by the dynamics of the magnetic island, they're typically modelled as constants. Here, wave kinetics and adiabatic theory are used to treat the feedback of the large scale magnetic island on the drift wave turbulence via shearing, radial advection, and temperature profile modification. The stresses exerted by the drift wave turbulence on the magnetic island are calculated by mean field methods, allowing for a fully self-consistent description of the coupled evolution of the system. It is found that nonlocal interactions between the drift wave turbulence and magnetic island lead to the formation of strong shears flows. Discussion of the impact of shear flow excitation on magnetic island evolution, especially perpendicular heat transport, is presented.

Christopher McDevitt
University of California at San Diego

Date submitted: 21 Jul 2006 Electronic form version 1.4