Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Diamagnetic drifts and turbulent transport: non-diffusive effects
DAVID E. NEWMAN, University of Alaska, USA, RAUL SANCHEZ, Universidad Carlos III de Madrid, SPAIN, DEBASMITA SAMADDAR, ITER, Cadarache, France — Recently, much progress has been made toward understanding the fundamental dynamics of turbulent transport in the presence of sheared flows. The insights have come from following Lagrangian trajectories using both gyrokinetic simulations of ITG turbulence [R. Sanchez et al, Phys. Rev. Lett. 101, 205002 (2008)] and fluid models of drift-wave turbulence [D.E. Newman et al, Proc. 35 EPS Conf. (2008)]. In this work we examine the impact of simple diamagnetic drifts on the dynamics of the transport using numerical simulations of 2D-turbulence in slab geometry with the BETA code. By itself, a diamagnetic drift velocity can have a significant an impact on the transport dynamics both with and across flow. However, when coupled with a sheared flow, additional dynamics are observed which could lead to interesting profile control tools if separately controlled. These new dynamics are in part the result of coherent structure formation localized to particular regions of the flows. The transport dynamics and their possible uses will be discussed.

David E. Newman
University of Alaska, USA

Date submitted: 22 Jul 2011 Electronic form version 1.4