Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Nonaxisymmetric Divertor Striations via 3D Modulations in Upstream Transport[1] M.W. SHAFER, J.M. CANIK, A.R. BRIESEMEISTER, J.D. LORE, R.S. WILCOX, A. WINGEN, ORNL, N.M. FERRARO, PPPL, G.R. MCKEE, U.W. Madison — A hypothesis presented here shows that divertor measurements during the application of resonant magnetic perturbations (RMPs) could be explained by toroidal modulations to upstream transport in the absence of any resonant field penetration. Experiments from multiple machines show helical lobes leading to 3D striations in the heat and particle flux. These observations are normally interpreted as a result of field penetration: either total (vacuum) or some level of screening (e.g. extended-MHD). However in the absence of tearing perturbations, these measurements can be shown to qualitatively result from toroidal modulations of upstream transport. Recent measurements and modeling show toroidal modulation of low-k turbulence at the outboard midplane with strong flow screening on DIII-D. This model may be able to reconcile 3D divertor measurements without the need for strong tearing perturbations in the pedestal, which can otherwise destroy the pedestal via stochasticity.

[1]Work supported by the US DOE under DE-AC05-00OR22725, DE-AC02-09CH11466, DFG02-89ER53296, DE-FC02-04ER54698.

M.W. Shafer
Oak Ridge National Laboratory

Date submitted: 12 Jul 2016 Electronic form version 1.4