

Abstract Submitted for the 56th Annual Meeting  
Division of Plasma Physics  
October 27–31, 2014  
New Orleans, Louisiana

Category Number and Subject:

[ ] Theory [ X ] Experiment

**Modeling EHO Formation in QH-mode on DIII-D,\*** Xi Chen, K.H. Burrell, N.M. Ferraro, T.H. Osborne, A.M. Garofalo, R.J. Groebner, L.L. Lao, P.B. Snyder, *GA*; R. Nazikian, WM. Solomon, B.J. Tobias, *PPPL*; G.R. McKee, Z. Yan, *UW*; C.M. Muscatello, *UCD* – The 3D MHD code M3D-C1 is being used to model the edge harmonic oscillation (EHO) in QH-mode plasmas. Preliminary simulations show unstable low- $n$  modes in some reconstructed QH-mode equilibria with high edge density fluctuations similar to experiments. QH-mode is a stationary edge localized mode (ELM)-stable high confinement operation mode while EHO drives the additional particle transport allowing the edge plasma to reach a transport equilibrium just below the ELM limit [1]. Experiments and theory suggest that the EHO is a kink-peeling mode destabilized by edge rotational shear at edge conditions just below the ELM limit [1] and the essential rotation is the toroidal angular ExB drift frequency [2]. Detailed comparison of two-fluid M3D-C1 simulations and fluctuation measurements from multiple diagnostics on DIII-D will be presented, along with the EHO onset condition between experiment and simulation from various pedestal ExB shears.

[1] K.H. Burrell, *et al.*, Nucl. Fusion **49**, 085024 (2009).

[2] A.M. Garofalo, *et al.*, Nucl. Fusion **51**, 083018 (2011).

\*Supported by US DOE under DE-FC02-04ER54698, DE-AC02-09CH11466, DE-FG02-89ER53296, DE-FG02-08ER54999, and DE-FG02-99ER54531.