

Abstract Submitted
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Quiescent H-Mode 3D MHD Free-Boundary Equilibrium¹ W. ANTHONY COOPER, JONATHAN P. GRAVES, BASIL P. DUVAL, LAURIE PORTE, OLIVIER SAUTER, TRACH-MINH TRAN, DANIELE BRUNETTI, DAVID PFEFFERLE, MADHUSUDAN RAGHUNATHAN, JONATHAN M. FAUSTIN, HAMISH PATTEN, ANDREAS KLEINER, HOLGER REIMERDES, Ecole Polytechnique Federale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP) — Free boundary magnetohydrodynamic equilibrium states with spontaneous three dimensional deformations of the plasma-vacuum interface are computed with the 3D VMEC solver [Hirshman *et al.*, Comput. Phys. Commun. **43** (1986) 143]. The structures we have obtained have the appearance of saturated ideal external kink/peeling modes. Large edge pressure gradients yield toroidal mode number $n = 1$ corrugations when the edge bootstrap current is large and $n = 4$ distortions when this current is small. The deformations of the plasma boundary region induces a nonaxisymmetric Pfirsch-Schlüter current that drives a field-aligned current ribbon which is consistent with experimental observations reported. We claim that the equilibrium states we compute model the Edge Harmonic Oscillation [K.H. Burrell *et al.*, Phys. Plasmas **22** (2005) 021805. W.M. Solomon *et al.*, Phys. Rev. Lett. **113** (2014) 135001] observed on DIII-D and the Outer Mode [E.R. Solano *et al.*, Phys. Rev. Lett. **104** (2014) 135001] found in JET during Quiescent H-mode operation.

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