

Abstract Submitted  
for the DPP13 Meeting of  
The American Physical Society

**Study of gyrokinetic edge blobs and vorticity merge dynamics in the SciDAC Center for Edge Physics Simulation<sup>1</sup>** C.S. CHANG, J. LANG, S. KU, PPPL, P.H. WORLEY, E.F. D'AZEVEDO, ORNL — Importance of blobs and vorticity merge physics for edge plasma transport has been theorized or conjectured for over a decade. However, a first-principles understanding has been difficult due to the complexity of the diverted edge geometry and the multiscale nature of edge physics. The full-f gyrokinetic code XGC1 has shown, for the first time, the generation of blobs from nonlinear electrostatic turbulence interaction with mean ExB shearing action, and their 3D motions across the pedestal and separatrix. Inward propagating holes are generated together. Many interesting physics phenomena have been found to be related to the blob and hole dynamics; which include vorticity merge to strengthen the neoclassical ExB shearing rate, inward particle pinch, inward momentum pinch, particle and thermal transport, and divertor heat load footprint.

<sup>1</sup>Work supported by US DOE OFES and OASCR, as part of the SciDAC EPSI project activities. HPC time has been provided through NERSC ERCAP and OLCF INCITE programs.

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Date submitted: 12 Jul 2013

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