Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

3D modeling of toroidal asymmetry due to localized divertor nitrogen puffing on Alcator C-Mod[1] J.D. LORE, Oak Ridge National Laboratory, Oak Ridge, TN, USA, M.L. REINKE, B. LABOMBARD, B. LIPSCHULTZ, Plasma Science and Fusion Center, MIT, Cambridge, MA, USA, R. PITTS, ITER Organization, St. Paul Lez Durance, France — For inductive operation at Q=10, ITER will need to run with partially detached divertor plasmas in order to maximize target lifetime and remain below engineering heat-flux limits. The radiated power fraction will be controlled via a divertor gas injection system that consists of six valves. To investigate the effect of potential toroidal asymmetry introduced by a finite number of gas valves, or the failure of one or more valves, experiments were performed on Alcator C-Mod. Nitrogen was injected through each of five toroidally spaced divertor gas valves into Ohmic L-mode plasmas with a high recycling divertor. Clear, reproducible toroidal variation in divertor radiated power and impurity line radiation was measured. The 3D scrape-off-layer transport code EMC3-EIRENE [1] is being used to model and interpret these experiments. Initial results indicate that trends in the radiated power and nitrogen emission asymmetry are reproduced. Both experimental and modeling results will be presented.

[1] Y. Feng, et al, J. Nucl. Mater. 266, 812 (1999).

[1]Work supported by D.O.E. contracts DE-AC05-00OR22725 and DE-FC02-99ER54512.

Ted Biewer
Oak Ridge National Laboratory, Oak Ridge, TN, USA

Date submitted: 10 Jul 2013 Electronic form version 1.4