Abstract Submitted
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Sensitivity of Alcator C-Mod Dissipative Divertor Operation to Toroidal Peaking of Extrinsic Low-Z Impurity Seeding[1] MATTHEW REINKE, JEREMY LORE, Oak Ridge National Laboratory, BRIAN LABOMBARD, JIM TERRY, DAN BRUNNER, BOB MUMGAARD, MIT Plasma Science and Fusion Center, RICHARD PITTS, ITER Organization, BRUCE LIPSCHULTZ, York Plasma Institute, Department of Physics, University of York, ALCATOR C-MOD TEAM — In most present experiments, mitigation of heat and particle fluxes to plasma facing components is not necessary to avoid engineering limits, while dissipative divertor operation will be a requirement for reactor-scale facilities. ITER will use distributed sub-divertor impurity injection and seeks to explore the impact of non-axisymmetric divertor seeding, a possible result of injector failure. Results are presented from Alcator C-Mod experiments exploring the sensitivity of pedestal temperature and energy confinement degradation to the toroidal distribution of extrinsic low-Z seeding. At moderate N_2 fueling levels, outer divertor power loading could be strongly reduced, reaching P_{ODIV}/P_{NET} <10%. In these case high confinement, $H_{98} \sim 1$, is sustained and plasmas are insensitive to the toroidal localization of the impurity seeding. Experiments with elevated N_2 that access a pronounced or fully detached regime demonstrate a transition to a reduced confinement H-mode, $H_{98} \sim 0.7$, which is sensitive to the toroidal peaking of the N_2 fueling. When utilizing all injection locations, minimizing non-axisymmetric effects, high confinement was sustained at total N_2 fueling rates that were at least 30-40% higher than if impurities were introduced at a single location.

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