

Abstract Submitted
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Motivation and goals of the new heated outer divertor for Alcator C-Mod¹ B. LIPSCHULTZ, J. DOODY, MIT-PSFC, R. ELLIS, PPPL, R. GRANETZ, MIT-PSFC, S. HARRISON, PPPL, B. LABOMBARD, R. VIEIRA, MIT-PSFC, H. ZHANG, PPPL, L. ZHOU, MIT-PSFC — A precision-aligned, high-temperature outer divertor is being developed for Alcator C-Mod to enhance heatflux handling and to advance our knowledge and experience with high-Z Plasma Facing Components (PFCs) in a reactor-level power density environment. Several departures from the design of the current divertor will be implemented: Instead of 10 toroidal divertor segments that expand toroidally as they heat up, the divertor plate will be toroidally continuous, with no openings or leading edges in the high-heat flux region. It will expand in the radial direction when heated while maintaining good alignment with shallow field line angles (~ 2 degrees), a requirement for future divertors. Those characteristics will reduce both impurity sources and disruption forces. A second design goal is to be able to control the divertor temperature up to 600°C by installing heaters in the structure. Given the Arrhenius relation between hydrogen diffusivity and temperature in tungsten (and molybdenum) this will open up a new area of study for tokamaks - exploration of the effect of PFC temperature on fuel retention. Temperature control may also open up a new area of study into the effect of changes in divertor recycling on fueling and core confinement.

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