

**Abstract Submitted for the Forty-Ninth Annual Meeting
Division of Plasma Physics
November 12–16, 2007, Orlando, Florida**

Category Number and Subject: 11.0.0 first micron mini-conference

Theory Experiment

Innovative Tokamak First Wall and Divertor Material Concepts,* C.P.C. Wong, *General Atomics* – For ITER design, the design guidance is to apply a Be layer on the plasma facing chamber surface. When extrapolated to DEMO design, the Be layer will not be suitable due to radiation damage. Similarly, a carbon surface will not be suitable due to high physical and chemical erosion rates, radiation damage of the material and potential large retention of tritium. Unfortunately, the remaining commonly proposed material, tungsten (W), could suffer radiation damage from α -charged particle implantation and experience blistering at the first wall and the formation of submicron fine structure at the divertor, which could result in W transport to the plasma core and severely limit the core performance. To resolve this potential impasse, an invention on the use of boron-infiltrated W-mesh surface is proposed to withstand ELMs and disruptions while retaining the capability of transmitting high-grade heat for power conversion. To make this concept work, in-situ boronization will be needed. Innovative first wall and divertor material concepts will be reviewed and initial development and identified requirements for the BW-mesh concept will be reported.

*Supported by the US DOE under DE-FC02-04ER54698.