

**Abstract Submitted for the 54th Annual Meeting
Division of Plasma Physics
October 29 through November 2, 2012
Providence, Rhode Island**

Category Number and Subject:

Theory Experiment

**Localized Fast-Ion Induced Heat Loads in Test Blanket
Module Mockup Experiments on DIII-D,***

G.J. Kramer, R.V. Budny, R. Ellis, R. Nazikian, *Princeton Plasma Physics Laboratory*; A.G. McLean, *Lawrence Livermore National Laboratory*; N.H. Brooks, M.J. Schaffer, M.A. Van Zeeland, *General Atomics*; W.W. Heidbrink, *UC-Irvine*; T. Kurki-Suonio, T. Koskela, *Helsinki U. of Technology*; K. Shinohara, *Japan Atomic Energy Agency*; J.A. Snipes, *ITER*; D.A. Spong, *Oak Ridge National Laboratory* – Localized hot spots can be created in ITER on the Test Blanket Modules (TBMs) because the ferritic steel of the TBMs distorts the local magnetic field near the modules and alters fast ion confinement. Predicting the TBM heat load levels is important for assessing their effects on the ITER first wall. Experiments in DIII-D were carried out with a mock-up of the ITER TBM ferromagnetic error field to provide data for validation of fast-ion orbit following codes. The front surface temperature of the protective TBM tiles was imaged directly with a calibrated infrared camera and heat loads were extracted. The detailed spot sizes and measured heat loads are compared with results from heat load calculations performed with a suite of orbit following codes. The codes reproduce the hot spots well, thereby validating the codes and giving confidence in predictions for fast-ion heat loads in ITER.

*Work supported in part by the US Department of Energy under DE-AC02-09CH11466, DE-AC51-07NA27344, DE-FC02-04ER54698, SC-G903402, and DE-AC05-00OR22725.