



Contribution ID: 205

Type: Poster

## ITR/P1-36: Assessment of the H-mode Power Threshold Requirements for ITER

*Tuesday, 9 October 2012 08:30 (4 hours)*

This paper contains a comprehensive multi-machine assessment on accessing and maintaining H-mode plasmas in ITER. The results from these joint experiments address L-H transition power threshold issues, which are not adequately included in the scaling from the ITPA H-mode power threshold database. Consequently, these results affect the ability to make accurate predictions for the H-mode threshold in ITER using the presently available H-mode scaling relationships and can be used to improve and reduce the uncertainty in these predictions. For the non-nuclear operational phase in ITER with H and/or He plasmas, experiments have been performed in ASDEX Upgrade (AUG),

C-Mod, DIII-D, JET, NSTX, and MAST. The ratio of  $P_{TH(H)}/P_{TH(D)}$  appears to be relatively consistent at about a value of 2. However, for helium there is a large variation in  $P_{TH(He)}/P_{TH(D)}$  from 1.0-2.0. On detailed examination of the results from the many devices, the ratio of  $P_{TH(He)}/P_{TH(D)}$  decreases towards unity with increasing L-mode (or target) electron density, which is a favorable trend for ITER operational scenarios at relatively higher target densities. The application of resonant magnetic perturbation (RMP) fields can lead to significant increases in the H-mode power threshold as has been determined in AUG, DIII-D, MAST and NSTX. Multi-machine results will also be presented on the H-mode confinement in He and also on modeling of ITER scenarios, based on the above results, and the predictions and implications for accessing H-mode plasmas in ITER.

This work was supported in part by the US Department of Energy under DE-FC02-04ER54698, DE-AC52-07NA27344, DE-FC02-99ER54512, and DE-AC02-09CH11466.

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International Tokamak Physics Activities

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**Session Classification:** Poster: P1

**Track Classification:** ITR - ITER Activities