

Abstract Submitted
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B-field Scaling of Locked Mode Error Field Threshold in Alcator C-Mod¹ R.S. GRANETZ, S.M. WOLFE, I.H. HUTCHINSON, MIT Plasma Science and Fusion Center, T. HENDER, UKAEA — One of the most ITER-relevant locked mode issues is the scaling of the threshold for error field locking, \tilde{B}/B , versus machine size, R . One way to obtain this is by comparing the locking threshold on tokamaks of different size. But the size scaling can also be obtained from just a single machine, utilizing dimensionless constraint arguments that relate it to B -field and density scaling. This alternative approach may provide a result with smaller uncertainty. On Alcator C-Mod this B -field scaling experiment has been carried out while also matching the ITER q_{95} (~ 3.2) and n/n_G (0.17, which is the ITER ohmic value and is the most relevant for locked modes). B_T was varied shot-to-shot from 3 to 7 tesla while the applied 2/1 error field was ramped during the steady-state portion of each shot to find the locking threshold. The result gives a B -field scaling exponent of -1.13, which in turn yields an exponent for the size scaling (R) of 0.59. This implies a locking threshold for \tilde{B}_{21}/B of $\sim 0.8 \times 10^{-4}$ in ITER at its ohmic density. This B -field scaling experiment in C-Mod included a point at the actual ITER field (5.3 T), in addition to the ITER q_{95} and n/n_G , which further reduces the extrapolation uncertainty.

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