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Boundary plasma heat flux width measurements for poloidal magnetic fields above 1 Tesla in the Alcator C-Mod tokamak DAN BRUNNER, BRIAN LABOMBARD, ADAM KUANG, JIM TERRY, MIT PSFC, ALCATOR C-MOD TEAM — The boundary heat flux width, along with the total power flowing into the boundary, sets the power exhaust challenge for tokamaks. A multi-machine boundary heat flux width database found that the heat flux width in H-modes scaled inversely with poloidal magnetic field (B_{p}) and was independent of machine size. The maximum B_{p} in the database was ˜0.8 T, whereas the ITER 15 MA, Q=10 scenario will be 1.2 T. New measurements of the boundary heat flux width in Alcator C-Mod extend the international database to plasmas with B_{p} up to ˜1.3 T. C-Mod was the only experiment able to operate at ITER-level B_{p}. These new measurements are from over 300 plasma shots in L-, I-, and EDA H-modes spanning essentially the whole operating space in C-Mod. We find that the inverse-B_{p} dependence of the heat flux width in H-modes continues to ITER-level B_{p}, further reinforcing the empirical projection of ˜500 μm heat flux width for ITER. We find ˜50% scatter around the inverse-B_{p} scaling and are searching for the 'hidden variables' causing this scatter. Supported by USDoE award DE-FC02-99ER54512.

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