Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Current Profile Measurements from Moderate to Strong Lower Hybrid Single-Pass Damping on Alcator C-Mod R.T. MUMGAARD, G.M. WALLACE, S.D. SCOTT, S. SHIRAIWA, I. FAUST, R.R. PARKER, MIT PSFC — Lower Hybrid Current Drive (LHCD) is an effective tool to non-inductively drive up to 100% of the plasma current on Alcator C-Mod. Measurements with an upgraded MSE diagnostic show that the fast-electron current profile is broader than the Ohmic current profile but still located the plasma core in agreement with strongly centrally peaked fast electron bremsstrahlung (FEB) measurements. Scans in a regime of high current drive efficiency across a range of density, LHCD power, launched n||, and plasma current show the driven current profile, FEB profile shapes, and current drive efficiency are sensitive only to total plasma current. Simulations using ray-tracing Fokker Planck codes show that the rays make 1-3 bounces through the plasma edge to bridge the spectral gap. Although in agreement with the total current, the simulations qualitatively disagree with experiment regarding current and FEB profiles as well as sensitivity to power and density. Simulations at higher plasma temperature and current predict stronger single-pass damping and preliminary experiments show increased current drive efficiency. Experiments to determine if the profile discrepancies persist when the ray bounces play a reduced role are planned, including companion experiments in D and He resulting in different edge plasma conditions. This work was performed on the Alcator C-Mod tokamak, a DoE Office of Science user facility, and is supported by USDoE awards DE-FC02-99ER54512 and DE-AC02-09CH11466.

Robert Mumgaard
MIT PSFC

Date submitted: 24 Jul 2015 Electronic form version 1.4