Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Absorption and Current Drive With Top Launch ECH on DIII-D[1] C.C. PETTY, XI CHEN, M. CENGHER, J. LOHR, R.I. PINSKER, D. SU, General Atomics, M.E. AUSTIN, U. Texas-Austin, B.S. VICTOR, LLNL — For the first time, the nearly vertical injection of "top launch" electron cyclotron waves is being tested on the DIII-D tokamak to verify the prediction of a high off-axis current drive efficiency. The top launch configuration takes advantage of the near-vertical geometry to combine a large Doppler shift with a long interaction zone to damp the waves on energetic electrons. Initial top launch experiments on DIII-D using a single gyrotron at 117.5 GHz and B≈1.7 T (i.e., 2nd harmonic absorption) will measure the power deposition profiles for both X-mode and O-mode by modulating the ECH power as part of a wave polarization verification. The top launch current drive efficiency also will be measured in low density, high electron temperature L-mode plasmas. The greatest current drive efficiency is expected when the wave power is damped mostly by tail electrons, which is controlled by shifting the vacuum resonance closer to or further away from the electron cyclotron waves. On DIII-D this is accomplished by varying B, and measurements of the absorbed power and current drive profiles will be shown.

[1]This work was supported by the US Department of Energy under DE-FC02-04ER54698.

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Date submitted: 01 Jul 2019 Electronic form version 1.4