

Abstract Submitted
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Wave Redux: Multiple Passes of EC Waves through the DIII-D Tokamak¹ KUSH MAHESHWARI, University of California, Berkeley, C.C. PETTY, R.I. PINSKER, XI CHEN, General Atomics — A model is being developed to track electron cyclotron (EC) waves as they pass multiple times through the plasma in the DIII-D tokamak. EC waves are a leading candidate to heat and drive current in tokamak reactor plasmas. Currently, the second harmonic X-mode (X2) polarization is favored due its high absorption in the plasma, but sometimes the plasma density is too high to allow the X2 waves to reach the plasma center. Second harmonic O-mode (O2) waves have twice the density limit of the X2 mode but are only partially absorbed on their first pass through the plasma. The O2 waves will reflect off the conductive graphite tiles and pass a second time through the plasma with possibly significant absorption. In this work, the TORAY ray tracing code has been extended to track multiple passes of EC waves through the plasma, including changes in polarization, to track secondary heating and current drive effects. By modulating gyrotron power and analyzing the electron temperature response, predictions from TORAY will be compared to experiments for which multiple passes may be important. Using the improved understanding of EC wave “bouncing” and resulting secondary power deposition, future experiments and reactors can use moderately absorbed EC waves more effectively.

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