Abstract Submitted
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Electron cyclotron ray tracing and absorption predictions for Compact Toroidal Hybrid plasmas using TRAVIS[1] S.F. KNOWLTON, G.J. HARTWELL, D.A MAURER, Auburn University, N.B. MARUSHCHENKO, Y. TURKIN, Max Planck IPP Greifswald, T. BIGELOW, Oak Ridge National Laboratory — Plasmas in the Compact Toroidal Hybrid (CTH), a five field period, $\ell = 2$ torsatron ($B_0 = 0.5\,\mathrm{T}$ $R_0 = 0.75\,\mathrm{m}$, $a_p \approx 0.2\,\mathrm{m}$) will be heated by second harmonic X-mode electron cyclotron heating with power provided by a 28 GHz gyrotron capable of producing up to 200 kW. Ray-tracing calculations that will guide the selection of the launching position, antenna focal length, and beam-steering characteristics are performed with the TRAVIS code [1]. Non-axisymmetric vacuum and current-carrying CTH equilibria for the ray tracing are modeled with the V3FIT code [2]. The calculated absorption is highest for vertically propagating rays that traverse the region where a saddle of resonant field strength exists. However, the absorption for top-launched waves is more sensitive to variations in the magnetic equilibria than for a radial side launch where the magnetic field profile is tokamak-like.

[1] N.B. Marushchenko, Y. Turkin, H. Maassberg, Comp. Phys. Comm. 185 165 (2014)
[2] J. D. Hanson et al., Nucl. Fusion 49, 075031 (2009)

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Gregory Hartwell
Auburn University

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