

# Finding Evidence for Density Fluctuation Effects on Electron Cyclotron Heating Deposition Profiles on DIII-D

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**Abstract.** Theoretical work, computation, and results from TCV [J. Decker “Effect of density fluctuations on ECCD in ITER and TCV,” *EPJ Web of Conf.* **32**, 01016 (2012)] suggest that density fluctuations in the edge region of a tokamak plasma can cause broadening of the ECH deposition profile. In this paper, a GUI tool is presented which is used for analysis of ECH deposition as a first step towards looking for this broadening, which could explain effects seen in previous DIII-D ECH transport studies [K.W. Gentle “Electron energy transport inferences from modulated electron cyclotron heating in DIII-D,” *Phys. Plasmas* **13**, 012311 (2006)]. By applying an FFT to the  $T_e$  measurements from the University of Texas's 40-channel ECE Radiometer, and using a simplified thermal transport equation, the flux surface extent of ECH deposition is determined. The Fourier method analysis is compared with a Break-In-Slope (BIS) analysis and predictions from the ray-tracing code TORAY. Examination of multiple Fourier harmonics and BIS fitting methods allow an estimation of modulated transport coefficients and thereby the true ECH deposition profile. Correlations between edge fluctuations and ECH deposition in legacy data are also explored as a step towards establishing a link between fluctuations and deposition broadening in DIII-D.

This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Fusion Energy Sciences, using the DIII-D National Fusion Facility, a DOE Office of Science user facility, under Award DE-FC02-04ER54698 and DE-FG03-97ER54415. DIII-D data shown in this paper can be obtained in digital format by following the links at [https://fusion.gat.com/global/D3D\\_DMP](https://fusion.gat.com/global/D3D_DMP).