

Abstract Submitted
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Scaling of Electron Thermal Conductivity during the Transition between Slab and Mixed Slab-Toroidal ETG Mode¹ VLADIMIR SOKOLOV, ABED BALBAKY, AMIYA K. SEN, Columbia University — Transition from the slab to the toroidal branch of the electron temperature gradient (ETG) mode has been successfully achieved in a basic experiment in Columbia Linear Machine CLM [1]. We found a modest increase in saturated ETG potential fluctuations ($\sim 2\times$) and a substantial increase in the power density of individual mode peaks ($\sim 4-5\times$) with increased levels of curvature. We have obtained a set of experimental scalings for electron thermal conductivity $\chi_{\perp e}$ as a function of the inverse radius of curvature R_c^{-1} for different fluctuation levels of the initial slab ETG mode. We found that thermal conductivity for pure slab modes is larger than it is for mixed slab-toroidal ETG modes with the same level of mode fluctuation. This effective reduction in diffusive transport can be partly explained by the flute nature of the toroidal ETG mode.

[1] A. Balbaky, V. Sokolov and A.K. Sen, Phys.Plasmas 22.

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