

Search for a critical electron temperature gradient in DIII-D L-mode discharges

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Abstract. Two experiments on DIII-D have been performed with the purpose of searching for evidence of a critical electron temperature gradient or gradient scale length. Both experiments employed off-axis electron current (EC) heating to vary the local value of $\Delta T_e/T_e$ while holding the total heating power and thus edge temperatures constant. No evidence of an inverse critical gradient scale length, k_{crit} , was observed in these experiments, but the existence of one cannot be ruled out by the experimental results. If k_{crit} exists, the experimental results indicate $k_{\text{crit}} < 3.8 \text{ m}^{-1}$ at $\rho = 0.45$ and $k_{\text{crit}} < 2.5 \text{ m}^{-1}$ at $\rho = 0.29$ corresponding to a critical gradient scale length larger than 43% and 65% of the plasma minor radius, respectively. Models other than one based on k_{crit} are also consistent with the experimental observations.