

Abstract Submitted
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Heat Pulse Thermal Conductivity in Alcator C-Mod L-mode and I-mode Plasmas¹ A.J. CREELY, MIT, E.M. EDLUND, PPPL, N.T. HOWARD, ORISE, A.E. HUBBARD, A.E. WHITE, MIT — I-mode plasmas are characterized by high energy confinement, similar to H-mode, but with L-mode-like particle confinement, making I-mode very favorable for reactors due to the natural absence of Edge Localized Modes (ELMs) [D.G. Whyte et al 2010 Nucl. Fusion 50, 105005]. It is also observed at Alcator C-Mod that core turbulence ($0.4 < r/a < 0.8$) is reduced in I-mode compared to L-mode [A.E. White et al 2014 Nucl. Fusion 54, 083019]. Power balance analysis indicates that the effective thermal diffusivity, is reduced in I-mode as well, and linear gyrokinetic analysis suggests that the growth rate of the ion temperature gradient mode is reduced in I-mode. It is of interest to consider perturbative transport analysis, not just steady state analysis. We calculate a perturbative thermal diffusivity from the propagation of heat pulses generated by sawtooth crashes. Preliminary analysis indicates that the heat pulse thermal diffusivity is reduced by 35% in I-mode compared to L-mode, which appears, superficially, to be consistent with the overall improved energy confinement in I-mode.

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