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Non-local Heat Transport in Alcator C-Mod Ohmic L-Mode Plasmas[1] C. GAO, J.E. RICE, MIT PSFC, H.J. SUN, WCI, Korea, M.L. REINKE, N.T. HOWARD, A.E. HUBBARD, M.A. CHILENSKI, J.R. WALK, J.W. HUGHES, P.C. ENNEVER, M. PORKOLAB, A.E. WHITE, C. SUNG, MIT PSFC, L. DELGADO-APARICIO, D. MIKKLESON, PPPL, Princeton, S.G. BAEK, MIT PSFC, W.L. ROWAN, M. BROOKMAN, IFS, Austion, M.J. GREENWALD, R.S. GRANETZ, MIT PSFC, AND ALCATOR C-MOD TEAM — Non-local heat transport experiments are performed in Alcator C-Mod Ohmic L mode plasmas by inducing edge cooling with laser blow-off impurity injection. The non-local effect is observed in low collisionality linear Ohmic confinement (LOC) regime plasmas. Transport analysis shows this phenomenon can be explained by a fast drop of the core diffusivity, or the sudden appearance of a heat pinch. Experiments with repetitive cold pulses experiments show that in LOC plasmas the electron thermal transport is not purely diffusive. In high density saturated Ohmic confinement (SOC) regime plasmas, the thermal transport becomes local. Measurements from a high resolution imaging x-ray spectrometer show that the ion temperature has a similar behavior (with a time delay) as the electron temperature in response to edge cooling, and the transition density of non-locality correlates with the density at which rotation reverses. This correlation may indicate the possible correction between thermal and momentum transport, which is also linked to the TEM to ITG mode dominance transition.. Linear gyrokinetic simulations suggest the turbulence outside r/a=0.75 changes from TEM dominance in LOC plasmas to ITG mode dominance in SOC plasmas.

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Chi Gao
MIT PSFC

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