

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Separation of particle and energy transport in the I-mode regime¹

A.E. HUBBARD, MIT PSFC, I. CZIEGLER, York Plasma Inst., T. HAPPEL, IPP Garching, J. W. HUGHES, MIT PSFC, P. MANZ, IPP Garching, J.E. RICE, T. WILKS, MIT PSFC, ALCATOR C-MOD TEAM, ASDEX UPGRADE TEAM — The I-mode regime is distinct among regimes of improved tokamak energy confinement in that it clearly separates particle and energy transport; I-mode has L-mode particle (main ion and impurity) confinement but high (H-mode-like) energy confinement. The phenomenology of the regime is well measured, and very similar, on both Alcator C-Mod and ASDEX Upgrade. A broad peak in fluctuations at a few hundred kHz, called the Weakly Coherent Mode, is observed. A fluctuating flow at the GAM frequency exchanges energy with the WCM and helps to broaden it. Transport in I-mode is observed to be more intermittent or ‘bursty’ than in L-mode. An Er well exists in I-mode which is deeper than in L-mode but weaker than in some H-modes. The transition from L-mode to I-mode is typically more gradual than the L-H transition and likely not the same type of bifurcation. The reason for the separation of transport channels is less clear. Possible physics mechanisms, and some initial simulations of underlying instabilities, will be discussed.

¹Work supported by the U.S. DOE under DE-FC02-99ER54512 and DE-SC0014264

Amanda Hubbard
MIT Plasma Science and Fusion Center

Date submitted: 14 Jul 2017

Electronic form version 1.4