

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Controlling the Cross-phase: A mechanism for the I-mode and other enhanced confinement regimes?. D. E. NEWMAN, Univ of Alaska-Fairbanks, P W. TERRY, Univ. of Wisconsin Madison, R SANCHEZ, Univ. Carlos III de Madrid — The I-mode and similar new transport regimes offer good confinement properties with reduced density limit issues and better control. While a number of different mechanisms have been identified for the formation and maintenance of enhanced confinement regimes few if any allow enhanced confinement in one channel but not another which is seen in the I-mode. We propose differential cross-phase modification as a possible mechanism for different transport in different channels. Simple dynamical models have been able to capture a remarkable amount of the dynamics of the core and edge transport barriers found in many devices. By including in this rich though simple dynamic transport model a simple model for cross phase effects, due to multiple instabilities, between the transported fields such as density and temperature, we can investigate whether the dynamics of more continuous transitions such as the I-mode can be captured and understood. This is backed up by multi-scale simulations on full gyro-kinetic codes. If correct this could have broad implications for transport in many systems. If this mechanism is valid, what can the model tell us about control knobs for these promising regimes?.

David Newman
Univ of Alaska- Fairbanks

Date submitted: 14 Jul 2017

Electronic form version 1.4