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Pulse Propagation and Fast Transient Transport Phenomena Models with Self Consistent Noise Z. WANG, P.H. DIAMOND, O.D. GURCAN, UCSD, La Jolla, CA, X. GARBET, CEA, Cadarache, France — A theoretical understanding of cold pulse propagation and fast transient phenomena has long remained elusive. Recent theoretical advances, such as the developing theory of turbulent spreading, have been motivated by the challenge of quantitatively modeling such pulse propagation phenomena. The most recent theoretical results suggest that both: turbulence spreading, the turbulence diffusion of the fluctuation intensity field; and fluctuation growth, with a critical gradient threshold and self-consistent transport evolution; are required to model pulse propagation. The first capture nonlinear intensity spreading, while the second at least partially represents avalanche phenomena. Here we extend the theory to the interesting questions of noise effects on pulse propagation. Experience with self-organized criticality theory suggests that very modest amounts of noise can nucleate avalanches and other extended transport events. Here we explore the self-consistent treatment of nonlinear noise arising from nonlinear coupling and the effect of noise on the spectrum of transport events.

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