Abstract Submitted
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Evidence for Chaotic Edge Turbulence in the Alcator C-Mod Tokamak[1] ZIYAN ZHU, Harvard University, ANNE WHITE, MIT PSFC, TROY CARTER, UCLA, JIM TERRY, SEUNG GYOU BAEK, MIT PSFC — Turbulence greatly reduces the confinement time of magnetic-confined plasmas; understanding the nature of this turbulence and the associated transport is therefore of great importance. This research seeks to establish whether turbulent fluctuations in Alcator C-Mod are chaotic or stochastic. Stochastic fluctuations may lead to a random walk diffusive transport, whereas a diffusive description is unlikely to be valid for chaotic fluctuations since it lives in restricted areas of phase space (e.g., on attractors). Analysis of the time series obtained with the O-mode reflectometer and the gas puff imaging (GPI) systems reveals that the turbulent density fluctuations in C-Mod are chaotic. Supporting evidence for this conclusion includes the observation of an exponential power spectra (which is associated with Lorentzian-shaped pulses in the time series) [1], the population of the corresponding Bandt-Pompe (BP) probability distribution [2], and the location of the signal on the Complexity-Entropy plane (C-H plane) [3]. These analysis techniques will be briefly introduced along with a discussion of the analysis results. The classification of edge turbulence as chaotic opens the door for further work to understand the underlying process and the impact on turbulent transport. [1] Maggs and Morales, Phys. Rev. E 86, 015401 (2012). [2] Bandt and Pompe, Phys. Rev. Lett. 88 , 174102 (2002) [3] Rosso *et al.* , Phys. Rev. Lett. 99 , 154102 (2007)

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