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Evidence for Chaotic Edge Turbulence in the Alcator C-Mod Tokamak[1] ZIYAN ZHU, UCLA, ANNE WHITE, MIT, TROY CARTER, UCLA, JIM TERRY, SEUNG GYOU BAEK, MIT — 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. This has an important impact on transport caused by turbulence in C-Mod: stochastic fluctuations sample all of phase space and can lead to diffusive transport, whereas chaotic fluctuations live in a restricted phase space (e.g. on attractors) and a diffusive description may not be valid. By analyzing the time series from an O-Mode reflectometer, turbulent edge density fluctuations in Ohmic plasmas and L-mode plasmas in the Alcator C-Mod tokamak are shown to be chaotic. Supporting evidence for chaos in the edge region includes: the observation of an exponential power spectra (which is associated with Lorentzian-shaped pulses in the time series) and the location of the signal in the Complexity-Entropy plane (C-H plane) and its corresponding Brandt-Pompe (BP) probability distribution [1]. These analysis techniques will be briefly introduced along with a discussion of the analysis results. Different diagnostic techniques, such as Gas Puff Imaging (GPI), could be used to confirm the results. [1] J. E. Maggs, T.L.Rhodes and G. J. Morales, Plasmas. Phys. Control. Fusion 57 (2015) 045004 (16pp)

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