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Comparison of Tokamak Plasma Turbulence Measurements to Self Organized Criticality Modeling[1] T.L. RHODES, E.J. DOYLE, W.A. PEEBLES, C.L. RETTIG, EE Dept. and Inst. of Plasma and Fusion Research, University of California, Los Angeles, R.A. MOYER, R. LEHMER, Fusion Energy Research Program, University of California, San Diego, R.J. GROEBNER, D.M. THOMAS, General Atomics — Measurements of plasma turbulence spectra and particle flux from the DIII–D tokamak exhibit significant agreement with predictions of self organized criticality (SOC) modeling [*e.g.*, B. Carreras *et al.*, Phys. Plasmas **3**, 2903 (1996)]. To make this comparison an improved method of obtaining turbulent fluctuation spectra in the plasma frame of reference (*i.e.*, where $V_{E\times B} \approx E_{\rm r}/B = 0$) was used. Utilizing this method, power spectra of density $\tilde{n}$ (both edge and core), potential $\tilde{\phi}$, and particle flux Γ are observed to have three regions of frequency dependence: f^0, f^{-1}, and f^{-4}. In addition, the particle flux probability distribution displays a Γ^{-1} scaling over two decades in Γ. These results provide the first evidence that the plasma is in a state consistent with SOC models and place a constraint on plasma transport models.

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☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: DIII–D Poster Session I (transport, turbulence, & stability), immediately following Rettig

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