

Abstract Submitted
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Observation of Chaos in a Magnetized Laboratory Plasma Due to An Applied Electrical Field¹ SHUANGWEI XIE, CHRISTOPHER WATTS, MARK GILMORE, LINCAN YAN, University of New Mexico — Experiment data from a linear helicon plasma (HelCat) device shows evidence of deterministic chaos when an external electric field is applied. The electric field is generated using a set of concentric rings which can be biased with respect to each other and the chamber wall. Biasing rings positively with respect to the wall can suppress the fluctuations caused by drift wave significantly and at the same time induce chaotic fluctuation via two different paths: period doubling and intermittence. This process can be seen clearly from the phase-delay plot and power spectrum: the attractor becomes more complicated and there is an increase in harmonic components with increasing positive bias. The qualitative behavior is verified by the correlation dimension and Lyapunov exponent calculations.

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Shuangwei Xie

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