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Dynamical transitions associated with turbulence in a helicon plasma ADAM D. LIGHT, LI TIAN, Swarthmore College, Swarthmore, PA 19081, USA, SAIKAT CHAKRABORTY THAKUR, Center for Energy Research, University of California San Diego, La Jolla, CA 92093, USA, GEORGE R. TYNAN, Department of Mechanical and Aerospace Engineering and Center for Energy Research, University of California San Diego, La Jolla, CA 92093, USA — Diagnostic capabilities are often cited as a limiting factor in our understanding of transport in fusion devices. Increasingly advanced multichannel diagnostics are being applied to classify transport regimes and to search for "trigger" features that signal an oncoming dynamical event, such as an ELM or an L-H transition. In this work, we explore a technique that yields information about global properties of plasma dynamics from a single time series of a relevant plasma quantity. Electrostatic probe data from the Controlled Shear Decorrelation eXperiment (CSDX) is analyzed using recurrence quantification analysis (RQA) in the context of previous work on the transition to weak drift-wave turbulence. The recurrence characteristics of a phase space trajectory provide a quantitative means to classify dynamics and identify transitions in a complex system. We present and quantify dynamical variations in the plasma variables as a function of the background magnetic field strength. A dynamical transition corresponding to the emergence of broadband fluctuations is identified using RQA measures.

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