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Coexistence of turbulence regimes in the Texas Helimak

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The turbulence of magnetically confined plasmas usually presents high-density pulses with short duration known as bursts. In the Texas Helimak, it is possible to suppress bursts in a broader region by applying a negative electrostatic bias. However, an almost unchanged burst rate persists in a region far from the location where bias is applied. We investigate the turbulence transition that occurs from the burst suppressed region to the burst dominated region by analyzing data from Langmuir probes in the whole radial extension of the machine. We find that such turbulence transition can be understood as an alternation of two different turbulent regimes, with the probability of being in each regime depending on the radial position. One regime, named as burst-free regime, consists of only Gaussian fluctuations and the other, named as bursty turbulent regime, is a train of pulses with double exponential temporal profiles, exponential amplitude distribution, and random occurring instants. This succession between burst-free and bursty turbulent regimes influences the equilibrium parameters.

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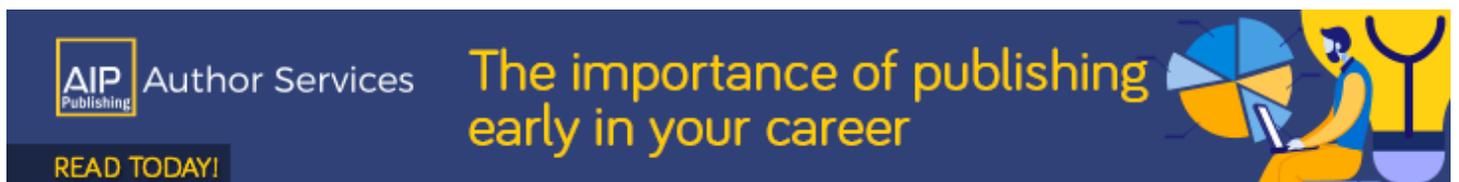
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