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Shearless barrier in the multiple spatial modes drift wave model

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A model based on the theoretical framework of drift wave turbulence is utilized to investigate anomalous transport in plasma magnetic confinement experiments. The drift wave model incorporates a perturbation consisting of an infinite number of spatial modes and a broad spectrum of frequencies, which is presented in such a way that it provides a Hamiltonian approximation, leading to a non-linear map. Investigations show that the radial profiles of the electric field, safety factor, and parallel velocity play an important role in transport, leading to topological rearrangements in phase space, among others, the presence of the shearless curve. In this work, we explore the influence of many spatial modes on the shearless barrier in terms of the control parameters using the winding number profiles, recurrence times, and transmissivity parameter space. In addition, even after the shearless destruction, the transport-blocking effect persists in its neighborhood to some extent, a consequence of the stickiness performing in the region.

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