

P5.4014 Onset of wave turbulence in dust acoustic waves

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See full abstract here <http://ocs.ciemat.es/EPS2019ABS/pdf/P5.4014.pdf>

In this work, wave turbulence transition from a stable plane wave to wave turbulence through intermediate weakly disordered state is investigated in self-excited 3D dust acoustic waves, composed of negatively charged particles suspended in low pressure RF discharges, through direct observing dust density fluctuations over a large area. Through wavelet transform, we demonstrate the extraction of three dimensional local turbulent sites (LTSs) associated with multi-mode excitation in spatiotemporal domains, from the ordered background in the xyt space. LTSs with high frequency bandwidth are found intermittently emerging around defect filaments with extremely low amplitude and decaying in the ordered background in the weakly disordered state. During the transition, LTSs rapidly spread and cluster around high amplitude sites with increasing LTS volume fraction, and eventually forming one percolating large cluster with other sparse ones, evidencing that wave turbulence transition is a type of percolation transition, similar to laminar-turbulent transition in hydrodynamic flows.

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