

## Interacting Multiscale Defects in Dust Acoustic Wave Turbulence

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In a single scale weakly disordered nonlinear wave, topological defects in the form of worm like filament has been observed [1]. Whether and how wave turbulence exhibits a continuous multi-scale power spectrum can also be characterized by multi-scale defects are challenging open issue due to difficulty of decomposing the modes through Fourier representation. In this work, through novel multi-dimensional empirical mode decomposition, we experimentally demonstrate the 3D dust acoustic wave turbulence can be view as a zoo of the interacting multiscale acoustic vortices with helical waveforms winding around worm-like defect filaments, similar to the multi-scale worm-like coherent vortices in the hydrodynamic turbulence.

[1] Y.Y. Tsai and L. I, Phys. Rev. E. **90**, 013106 (2014)