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Anxo Biasi (talk 3): Solvable models for energy cascades and condensation via coherent dynamics in Hamiltonian systems

Tuesday, June 10, 2025 2:00 PM (45 minutes)

In this talk, I will present recent results on energy cascades and structure formation in Hamiltonian systems. I will introduce two families of solvable systems that explicitly illustrate the dynamical development of energy cascades and the emergence of large- and small-scale structures. Some solutions represent condensate formation through highly coherent dynamics, while all cascade solutions exhibit power-law spectrum formation in finite time, leading to the blow-up of Sobolev norms and singularities. Such analytic solutions will be compared with numerical simulations, revealing the difficulties numerical methods have to overcome to get accurate descriptions of blow-up and weak turbulence.