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Unstable Periodic Orbits in Experimental Kolmogorov-Like Flow¹ LOGAN KAGEORGE, Georgia Inst of Tech, BALACHANDRA SURI, IST Austria, ROMAN GRIGORIEV, MICHAEL SCHATZ, Georgia Inst of Tech — The geometry of state space for a moderately turbulent flow is shaped by non-chaotic Navier-Stokes solutions known as Exact Coherent Structures (ECS). It has been shown in numerical studies of pipe flow that unstable periodic orbits, one such ECS, guide the evolution of nearby trajectories and form the backbone of the chaotic attractor. However, until now little experimental work has been done to show if periodic orbits are frequently visited in fluid systems and are therefore relevant to the dynamics of the system. We report on numerical work to identify periodic orbits and describe their dynamical relevance in experiments of weakly turbulent quasi-two-dimensional Kolmogorov-like flows.

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