Abstract Submitted
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**Turbulent cascades in a homogeneous Bose gas with tuneable interactions** JAKE GLIDDEN, LENA BARTHA, CHRISTOPH EIGEN, TIMON HILKER, University of Cambridge, ROBERT SMITH, University of Oxford, ZORAN HADZIBABIC, University of Cambridge — Turbulence is a complex phenomenon manifest in a myriad of systems, ranging from ocean waves to supernovae. A ubiquitous concept within turbulence is the cascade of excitations through momentum space, between energy-injection and dissipation lengthscales. Over this range, various quantities (e.g. the wave energy) exhibit steady-state power-law distributions in momentum space. Over the past few years ultracold atomic gases have become a novel platform for studies of turbulence. Recent work showed the development of a power-law cascade with an exponent consistent with mean-field predictions. However, so far little is known about the dependence of steady-state properties on the strength of the interactions that are needed to establish the cascade in the first place. Here we explore the effects of inter-particle interactions on the turbulent-cascade dynamics using a homogeneous $^{39}$K Bose gas, which offers tuneable interaction strength via a Feshbach resonance. We find universal behaviour of the turbulent cascade dynamics across a range of different scattering lengths.

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