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Emergence of a Turbulent Cascade in a Quantum Gas NIR NAVON, ALEX GAUNT, ROB SMITH, ZORAN HADZIBABIC, University of Cambridge — The recent realisation of Bose-Einstein condensates in uniform traps has opened interesting possibilities to study far-from-equilibrium phenomena with textbook systems. In this talk, we will present a study where we drive a homogeneous Bose-Einstein condensate (BEC) out of equilibrium with an oscillating force that pumps energy into the system at the largest lengthscale. In the limit of weak drives, the BEC's response is linear, well captured by its lowest-lying excitations. For stronger drives, a nonlinear response is apparent and we observe a gradual development of a cascade characterised by an isotropic power-law distribution in momentum space. Our conclusions are well supported by comparison with numerical simulations of the Gross-Pitaevskii equation.

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