

## Experimental Observation of a Two-Regime Spectrum in Rotating Turbulence

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Transition from three-dimensional to quasi-two-dimensional turbulence in a rotating frame is experimentally investigated. A decaying turbulent field is generated from oscillating a grid in a rotating water tank, and velocity measurements are performed using particle image velocimetry. The power spectrum,  $E(k)$ , measured in the plane normal to the rotation axis, shows a transition from the classical Kolmogorov  $k^{-5/3}$  spectrum towards a  $k^{-2}$  spectrum as the Rossby number is decreased. For intermediate values of  $Ro$ , a two-regime spectrum can be observed, showing a crossover between the 3D and quasi-2D regimes, in good agreement with the phenomenology proposed by Zhou [Phys. Fluids 7:2092 (1995)]. This mixed regime takes place in a narrow band of Rossby numbers, from  $Ro_{3D} \simeq 0.15 \pm 0.10$  down to  $Ro_{Q2D} \simeq (0.10 \pm 0.03)Re^{-1/2}$ .

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