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High order structure functions and intermittency in decaying rotating turbulence[1] JACOPO SEIWERT, GUANGKUN TAN, MARC RABAUD, FREDERIC MOISY, Laboratory FAST, University Paris-Sud — Longitudinal and transverse velocity structure functions are measured in a decaying rotating turbulence experiment by means of Particle Image Velocimetry (PIV). Turbulence is generated by rapidly towing a grid through the fluid, providing an initial state which is approximately homogeneous and isotropic. During the self-similar decay of turbulence, before the Ekman timescale, structure functions up to order 8 show well-defined power laws in the inertial range. For moderate Rossby numbers, the exponent of the second-order longitudinal structure function, ζ_2, is found to increase in time, in agreement with the steepening of the power spectrum, but the normalized higher-order exponents, ζ_p/ζ_2, remain close to those of the intermittent non-rotating case (She-Leveque model). For smaller Rossby numbers, a slight departure of ζ_p/ζ_2 from the intermittent curve is observed, although it remains far from the non-intermittent linear prediction $\zeta_p/\zeta_2 = p/2$. These results are compared to recent experiments and simulations of forced rotating turbulence.

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