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Turbulence decay downstream of an active grid[1] GREGORY BEWLEY, EBERHARD BODENSCHATZ, Max Planck Institute for Dynamics and Self-Organization — A grid in a wind tunnel stirs up turbulence that has a certain large-scale structure. The moving parts in a so-called "active grid" can be programmed to produce different structures. We use a special active grid in which each of 129 paddles on the grid has its own position-controlled servomotor that can move independently of the others. We observe among other things that the anisotropy in the amplitude of the velocity fluctuations and in the correlation lengths can be set and varied with an algorithm that oscillates the paddles in a specified way. The variation in the anisotropies that we observe can be explained by our earlier analysis of anisotropic "soccer ball" turbulence (Bewley, Chang and Bodenschatz 2012, Phys. Fluids). We define the influence of this variation in structure on the downstream evolution of the turbulence.

[1]with Eberhard Bodenschatz and others

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