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An Investigation of Length Scales in Active Grid Generated Turbulence[1] R. JASON HEARST, PHILIPPE LAVOIE, University of Toronto — A novel active grid design is used to generate high Reynolds number homogeneous, isotropic turbulence. Typically, active grids consist of square wings mounted on a bi- planar mesh of rods. Each rod of the mesh is controlled independently by a stepper motor, which receives randomly varied signals defining its period and speed of rotation. The present design consists of two bi-planar rod meshes. Wing placement alternates between the forward and aft meshes, allowing for the motion of adjacent wings to be decoupled by mounting them on independently rotating rods. By changing the degree of correlation between the motion of wings, the length scales of the output turbulence may be influenced while the turbulence itself remains approximately homogeneous and isotropic. Furthermore, the structure of the turbulence may be dependent on the wing geometry. As such, alternative wing geometries (e.g. circular) are also investigated. The primary focus of this study is to investigate the effect of initial conditions on the length scales of turbulence in the context of active grid generated turbulence.

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