

Abstract Submitted
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Rotation rate of inertial fibers in turbulence GAUTIER VERHILLE, IRPHE - Aix-Marseille Univ - Centrale Marseille - CNRS, SIHEM BOUNOUA, GILLES BOUCHET, IUSTI - Aix-Marseille Univ - CNRS — Since 2010 more and more studies in Lagrangian turbulence are devoted to anisotropic particles. Our work is motivated by two recent studies from Parsa and Voth [1] and Bordoloi and Variano [2]. They observed two different scalings for the tumbling rate of fiber-like particles. The first one, with thin particles, depends only on the fiber length and is in agreement with slender body approximation [1]. The other, with thick particles, find the same scaling for the length but needs to introduce the particle aspect ratio [2]. The aim of our study is to study the transition from thick to thin particles. For this purpose, we measure the rotation of cylindrical fibers in a turbulent flow generated by the rotation of eight motors located at each corner of a cubic tank. To characterize the transition from thick to thin particles, both the length and the diameter of the fiber is varied and compared to the prediction from slender body theory.

S. Parsa and G.A. Voth, **Inertial Range Scaling in Rotations of Long Rods in Turbulence**, *Phys. Rev. Lett.*, **112**, 024501 (2014). [2] A. K. Bordoloi and E. Variano, **Rotational kinematics of large cylindrical particles in turbulence**, *J. Fluid Mech.*, **815**, 199-22 (2017).

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