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A flexible fiber in a turbulent flow: a macroscopic polymer? GAUTIER VERHILLE, CHRISTOPHE BROUZET[1], PATRICE LE GAL, IRPHE - CNRS - Aix-Marseille Univ. - Ecole Centrale Marseille — We describe, for the first time, an experiment devoted to the study of the spatial conformation of a flexible fiber in a turbulent flow. We propose a model for the transition from rigid to flexible regimes as the intensity of turbulence is increased or the elastic energy of the fiber is decreased. This transition occurs for a fiber typical length which is observed experimentally and recovered by our analysis. We also demonstrate that the conformations of flexible fibers in a turbulent flow are analog to conformations of flexible polymers in a good solvent. This last result opens some new and creative ways to model flexible fiber distortions in turbulent flows while addressing fundamental problems in polymer dynamics.

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