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Analysis of the breakup of a viscous thread in a turbulent flow MONICA MARTINEZ-ORTIZ, ERNESTO MANCILLA, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — An experimental study was conducted to analyze the stability and breakup of a viscous thread in an isotropic turbulent flow. The motivation for this study arises from the need to understand the mechanisms that control the formation of emulsions of very viscous liquids. Experiments were performed in an isotropic turbulence chamber, in which a single thread was injected. The fluid disturbances on the thread's surface were studied for filaments of different diameters and lengths. The turbulence intensity was varied for each case. The fluid velocity was characterized using a Particle Image Velocimetry (PIV) system. The threads and their temporal evolution were visualized with a high speed camera. We observed that for most conditions the filaments are surprisingly stable; they are largely elongated until their diameter is very small. A dimensionless analysis indicated that at large diameters the filaments respond to turbulent fluctuation, while at small diameters capillary forces dominate.

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