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Formation of Long Tails during Breakup of Oil Droplets Mixed with Dispersants in Locally Isotropic Turbulence[1] BALAJI GOPALAN, JOSEPH KATZ, Johns Hopkins University — This study investigates experimentally, the effects of adding dispersants on the breakup of crude oil droplets in turbulent flows during oceanic spills. The current measurements are performed in a nearly homogeneous and isotropic turbulence facility, the central portion of which is characterized using 2-D PIV. Sample crude oil from Alaska National Slope is mixed with dispersant COREXIT 9527 and injected into the central portion of the turbulent facility. High speed, in-line digital holographic cinematography is utilized to visualize the breakup of droplets at high spatial and temporal resolution. We observe that, in some cases, after the droplet breaks up, the elongated portion of the droplet does not recoil, leaving an elongated tail, probably due to the low local surface tension. At high dispersant to oil ratios, extremely thin tails extend from the droplet, and are stretched by the flow. Breakup of these thin threads produces very small oil droplets, a desired effect during cleanup of oil spill.

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