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Controlling a liquid jet inside the regular breakup regime by applying a composite disturbance to the actuator MINA ROHANI, DEREK DUNN-RANKIN, FARYAR JABBARI, University of California, Irvine — In this work, we control the breakup characteristics of a liquid jet by manipulating a piezoelectric actuator and thus the disturbance applied to the jet. We are thereby able to provide desirable droplet size patterns over a wide frequency range. The regular breakup regime refers to the frequency range where the breakup characteristics are repeatable. Thus, although the droplets may not be uniform in size, they pinch off the stream at a constant rate. The regular breakup regime for different jet velocities and diameters has been specified experimentally. The experiments show formation of secondary droplets between main droplets, mostly around the lower frequency range of the regular breakup regime. We remove these secondary droplets by sending a composite disturbance comprising of a fundamental disturbance at the principal driving frequency and another harmonic mode. The choice of the additional harmonics depends on the desired droplets size pattern. It is thus possible to relate initial input disturbance waveform to the droplet formation pattern.

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