

Abstract Submitted
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A low-cost, precise piezoelectric droplet generator¹ TANYA LIU, DANIEL M. HARRIS, JOHN W.M. BUSH, Massachusetts Institute of Technology — We present the design for a piezoelectric drop-on-demand generator capable of producing highly repeatable, millimetric droplets. The generator is low-cost, simple to fabricate, and easily reproduced. We demonstrate that droplet diameter can be controlled through variation of the piezoelectric driving waveform parameters. Our experiments demonstrate that if waveform amplitude is fixed, droplet diameter is directly dependent on waveform pulse width, allowing for a range of droplet sizes to be produced for a fixed nozzle diameter. Successful droplet generation occurs only within a finite range of pulse widths; however, outside of this range satellite droplets form or no droplet generation occurs. We also discuss the dependence of droplet size on other system parameters including pressure at the nozzle plane and nozzle diameter. These results make the generator design potentially applicable to a wide range of fluids experiments where repeatable millimetric droplets are required.

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