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Small drops from large nozzles[1] ALFONSO ARTURO CASTREJON-PITA, University of Oxford, AHMED SAID MOHAMED, Dept. Ing. Aerospacial y Fluidomecanica, Universidad de Sevilla, JOSE RAFAEL CASTREJON-PITA, Queen Mary University of London, MIGUEL ANGEL HERRADA, Dept. Ing. Aerospacial y Fluidomecanica, Universidad de Sevilla — We report experimental and numerical results of the generation of drops which are significantly smaller than the nozzle from which they are generated. The system consists of a cylindrical reservoir and two endplates. One plate is a thin metal sheet with a small orifice in its centre which acts as the nozzle. The other end consists of a piston which moves by the action of an elecromechanical actuator which in turn is driven by sine-shape pull-mode pulses. The meniscus (formed at the nozzle) is thus first overturned, forming a cavity. This cavity collapses and a thin and fast jet emerges from its centre. Under appropriate conditions the tip of this jet breaks up and produces a single diminutive drop. A good agreement between the experimental and numerical results was found. Also, a series of experiments were performed in order to study the effects that the pulse amplitude and width, together with variations in the liquid properties, have over the final size of the droplet. Based on these experiments, a predictive law for the droplet size has been derived.

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