Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Dripping dynamics at high Bond numbers[1] MARIANO RUBIO-RUBIO, PALOMA TACONET, ALEJANDRO SEVILLA, Departamento de Ingeniería Térmica y de Fluidos, Universidad Carlos III de Madrid, Spain — When dispensing liquid from a vertically oriented injector under gravity, drops grow at the outlet until the surface tension forces can no longer balance their weight, and the pinch-off occurs. This dripping regime no longer exists above a critical flow rate, at which an abrupt transition to jetting takes place. These phenomena are governed by the liquid properties, the injector size and the injection flow rate, or non-dimensionally, by the Bond, Bo, Weber, We, and Kapitza, Γ, numbers. Detailed accounts of the rich dynamics of the dripping regime and the transition leading to jetting can be found in the literature (e.g. Phys. Rev. Lett. vol. 93, 2004, and Phys. Fluids vol. 18, 2006), but only for two different values of Bo. Therefore, we present new experiments on the dripping dynamics and jetting transition for a wide range of both the liquid viscosity and the size of the injector, reaching values of Bo up to one order-of-magnitude larger than those present in the literature. Our results reveal the existence of new dynamics in the dripping regime not observed at small Bond numbers. In addition, we quantify the hysteresis present in the dripping-jetting transition, previously measured only for the inviscid case.

[1]Supported by Spanish MINECO under project DPI 2011-28356-C03-02.

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Date submitted: 01 Aug 2014 Electronic form version 1.4