

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Electrohydrodynamic tip streaming in electro-coflow.¹ JOSEFA GUERRERO MILLAN, BENJAMIN OVERLIE, Augusta University — In electrospray, the minimum flow rate is the smallest flow rate at which you can sustain a cone-jet steady in time. Although its nature is not well understood, it has many advantages from the experimental point of view: it generates the smallest drops and they are very monodisperse. When these experiments are performed in a low viscosity bath, it is found that it can be reached a smaller minimum flow rate than that of the classical electrospray. In this work, we explore that minimum bound in electro-coflow using glass-based microfluidic devices. Thus, there are new variables to consider, the viscosity and velocity of the outer medium, and how the liquids are driven. Using a pressure driven setup, we found a parametric window of operation where electrohydrodynamic tip streaming is observed. In this regime, the concept of minimum flow rate is lost. We explored the parametric window of operation where electrohydrodynamic tip streaming can be observed and the type of steady modes (cone-jet or whipping) that are observed.

¹Acknowledgment is made to the donors of the American Chemical Society Petroleum Research Fund for support (or partial support) of this research (60302-UR9).

Josefa Guerrero Millan
Augusta University

Date submitted: 29 Jul 2020

Electronic form version 1.4