

Abstract Submitted  
for the DFD07 Meeting of  
The American Physical Society

**Generation of micron-sized drops with viscous co-flows** ALVARO

G. MARIN, JOSE M. GORDILLO, University of Seville — In this presentation, the generation of micron-sized drops (smaller than 1.5 microns) will be shown to be obtained through a simple device, suggested by the numerical experiments by R. Suryo and O. A. Basaran (“Tip streaming from a liquid drop forming from a tube in a co-flowing outer fluid”, *Phys. Fluids* 18, 082102, 2006), in which two liquid streams co-flow coaxially under creeping flow conditions. Here we determine the appropriate experimental range of the dimensionless parameters in which tiny jets, over two orders of magnitude smaller than the drop from which they originate, are formed; this regime is achieved without resorting to the use of neither surfactants nor electric fields. In addition, the scaling for the drop diameter, which is provided as a function of the flow rate ratio and the viscosity ratio, predicts well the experimentally measured drop diameters, which range between 1.5 and 30 microns. Finally, we will also discuss on the analogies and differences between the present technique and some other alternative methods for the generation of microemulsions, namely, flow-focusing and electrosprays. In conclusion, we describe a feasible and cheap alternative experimental method for the generation of microemulsions that can be easily reproduced at any laboratory.

Alvaro G. Marin  
University of Seville

Date submitted: 26 Jul 2007

Electronic form version 1.4