Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Conical singularities inside cone-jet electrosprays ALVARO G. MARIN, University of Seville, IGNACIO G. LOSCERTALES, University of Malaga, ANTONIO BARRERO, University of Seville — In coaxial jet electrosprays inside liquid baths, a conductive liquid forms a cone-jet electrospray in a bath containing a dielectric liquid. An additional dielectric liquid is injected inside the Taylor cone forming a liquid meniscus. In certain circumstances, however, we have observed that the dielectric menisci present extremely sharp tips, without mass emission, that can be stabilized and made completely steady. In this presentation we will first explore the parametrical range of liquid properties, mainly viscosities and surface tensions, under which these sharp tips take place. Secondly, we have developed a simple analytical model for the very complex electro-hydrodynamical flow, which predicts the angle of the tip as a function of the liquid properties. Therefore, we are able to compare it with the results of the experiments. When the liquid meniscus is slowly fed, the cusped interface turns into a spout which flows coated by the conducting liquid forming the electrified coaxial jet which has been successfully employed for the production of double emulsions (Marin et al., Phys. Rev. Lett. 98, 014502, 2007).

Alvaro G. Marin
University of Seville

Date submitted: 31 Jul 2007 Electronic form version 1.4