

Abstract Submitted  
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**Electrosprays generated by a DC electric field**<sup>1</sup> DEMETRIOS PAGEDORGIU, DEVIN CONROY, RICHARD CRASTER, Imperial College London, HSUEH-CHIA CHANG, Notre Dame University, OMAR MATAR, Imperial College London — The breakup of an electrified jet in a gas with an axially applied electric field is investigated theoretically. The jet fluid is taken to be a symmetric electrolyte and proper modelling of the cationic and anionic species is used by considering the Nernst-Planck equations in order to find the volume charge density that influences the electric field in the jet. The governing equations are investigated asymptotically in the long wave limit and the one dimensional model is solved numerically as a function of the hydrodynamic, electrical, and electrokinetic parameters. The electric field causes the jet to stretch and thin to a point where ion repulsion forces the jet to undergo Rayleigh fission. We measure the distance at which this point occurs by comparing the jet radius to the distance at which ion repulsion is important.

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