

# **Opto-Electric Characterization of an AC Field Controlled Electrospray**

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## **Abstract:**

Electrospray is successfully used as an ionization method for large biological molecules. The droplet dynamics and coulombic fission are key factors in the ionization efficiency of an electrospray ion source (ESI). We investigate droplet dynamics of an electrospray controlled by a ring generated field obtained from a high voltage amplifier driven by a signal generator. A high speed camera is used for image acquisition of droplet dynamics. Triangle, sine, and square high voltage signals are applied to the ring. Our study shows the presence of a resonant frequency for each set of DC and AC parameters and geometry settings. At resonant frequency the onset voltage for electrospray is minimum. Further studies of resonant frequencies with ring diameter and needle-plate are also reported. The current variations are related to the ring controlled voltage, droplet dynamics and coulombic fission. The presence of the resonant frequency offers a wide range of control and modulation for the onset voltage of the electrospray, which could potentially be used for industrial applications.