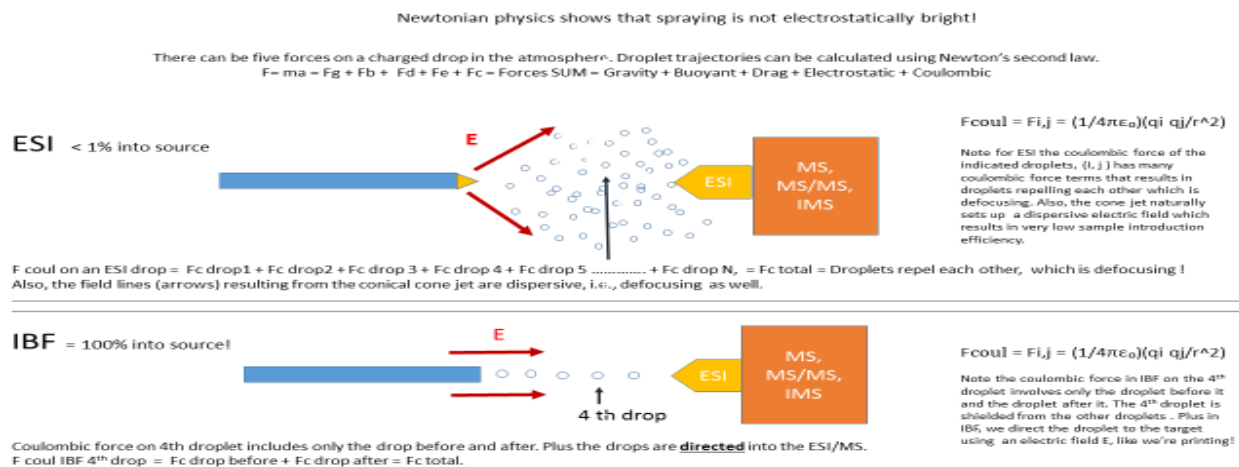


## Saving Viscous Liquid Evidence & Analyzing It Via One Induction Based Fluidic Device By ESI & MALDI.

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Via 14 publications and ca. 35 presentations we've demonstrated a new paradigm in ESI MS sample introduction, (Induction Based Fluidics, IBF), the fastest (msec.) ESI/MS sample introduction technique in the world that is the most introduction efficient (100%, varied). The same technology, device has been shown by NIH, NIST, Washington University at St. Louis, USF, and JEOL to enhance MALDI, SIMS, and other techniques by factors of 10 to 100x, LITERALLY! Wisconsin researchers have demonstrated single cell MALDI, as well, discovering six never before identified proteins in neurons (See [nanoliter.com/references2014.pdf](http://nanoliter.com/references2014.pdf)). Scheeline, et al, of Illinois published in AC this year direct nL deposition into levitated uL droplets, in milliseconds. See AC, DOI: [10.1021/ac403968d](https://doi.org/10.1021/ac403968d).



Recently, we've produced video clips showing the ability, as published in Analytical Chemistry in 2013 ([pubs.acs.org/doi/abs/10.1021/ac00094a021](https://pubs.acs.org/doi/abs/10.1021/ac00094a021)), to analyze CMPO chelates of the entire Lanthanide series (and Actinide?) in positive ion and negative ion mode, maintaining 20 k resolution, performing > 6400 determinations in a two day period at Idaho National Laboratory (INL). We've speculated using special INL chelates, high resolution ToF's (and old ion traps?) using an IBF dispenser that one could analyze the entire Lanthanide and Actinide series at femtogram, attogram levels in one 50 nL drop, using an IBF dispenser only, w/out any plasma!

At ASMS 2014 with Merck, INL and the University of Cincinnati, we showed an IBF LCMS application applied to the analysis of oligonucleotides, a particularly difficult analytical analysis for traditional ESI/LC/MS showing data 50x more sensitive than nanoSpray. Also, at Asliomar 2014, we showed that IBF yields normal ESI mass spectra as we shoot droplets in a straight line like this..... attaining 100% introduction efficiency with droplet level control.

Using IBF, NIST has published the analysis of RDX and cocaine yielding ca. 100x improvement in sensitivity for SIMS. We've also analyzed and acquired direct mixture ESI mass spectra of coffee, urine with drugs, complex mixtures of drugs of abuse, and we've shown ca. 17.5 increases in sensitivity of MALDI for proteins and peptides at Genentech, <http://nanoliter.com/contactus.htm>. Also, IBF has been shown to accurately dispense nanoLiters of whole blood into devices and onto targets, non-touch. Also, the US Army has adopted IBF dispenser for the direct application of viscous agents onto animals, for ESI/MS and MALDI sample analysis, using the same device.

Here, we contrast the physics if IBF with normal ESI. We discuss IBF sample deposition applications, as well. We show video clips of acquired MS data, citing new IBF dispensing data. We predict that IBF will ultimately make IBF based "ESI/MS" ca. 100-1000 times more sensitive than today having, had many users published 10- 100 x increase in sensitivity for MALDI, SIMS and other techniques. Finally, we address why electric induction that yields droplet level control, affords other new advances across analytical chemistry from TLC to PCR to, of course, MS.