Induction Based Fluidics (IBF), Fundamentals & Applications of An Inductive Atmospheric Sample Energizing Technique And Two Questions.

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In this poster, we present the fundamentals of induction based fluidics (IBF), a technique that charges (i.e. energizes) liquids in the atmosphere for a variety of purposes. We show that IBF can launch drops, not sprays, of low volumes of liquids into and onto targets including into DART TOF and other mass spectrometers producing (M+H)+ ions from drugs as it places 100% of the liquid therein. We also show that IBF can dispense and direct liquids to all types of targets as well.

Furthermore, we show that at ASMS 2010 as presented by Cody and Dane of JEOL have shown a 10 to 100x increase in sensitivity when using nanoliter size samples in DART TOF sample introduction applications for small drug molecules. We also cite IBF results of a recent paper from the University of Wisconsin (Jarecki, Vestling, Stretton, et al) where they demonstrated single cell MALDI, identifying six novel and other proteins in one neuron using IBF in a sample prep mode. Furthermore, we show that NIST has published, using IBF for nanoliter dispensing, a 100 to 1000 increase in sensitivity for RDX and cocaine this year in RCM. This follows the JASMS published works in 08 and 09 of Tu, Gross and Harmon where MALDI sensitivity was improved for proteins, peptides and synthetic polymers by factors of 5 to 10 x. using IBF nL depositions.

In this poster, we describe IBF, and applications and provide the equations of motion of changed drops flying in the atmosphere to targets like MS devices. We also pose and partially answer two questions: “Why does this atmospheric energizing technique, IBF, dramatically improve sensitivity in DART, MALDI and SIMS applications?” We also preliminarily ask: “Can IBF replace ESI?”, as it can launch 100% of discrete drops, without faradaic processes, creating ions for DART TOF MS (and presumably other MS systems) as it energizes and directs them to the MS system.