

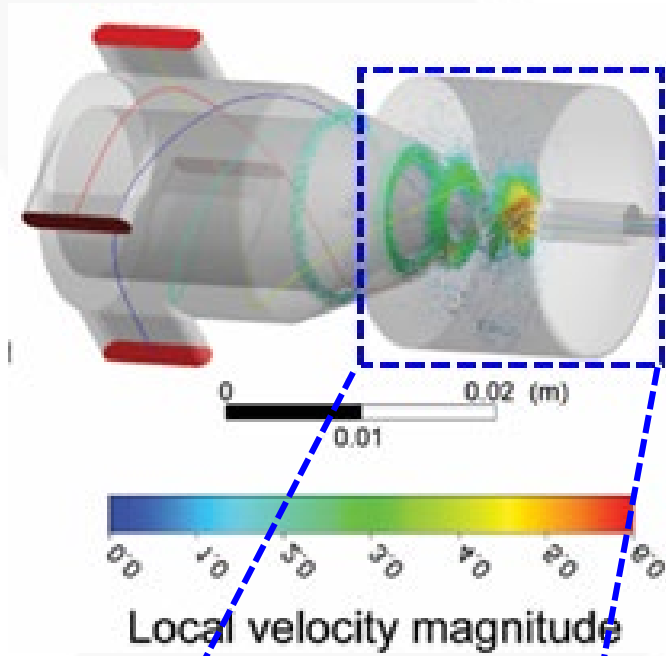
# DRILL

(DRy Ion Localization and Locomotion)  
Interface for Droplet Transmission and  
Ion Desolvation in ESI-MS

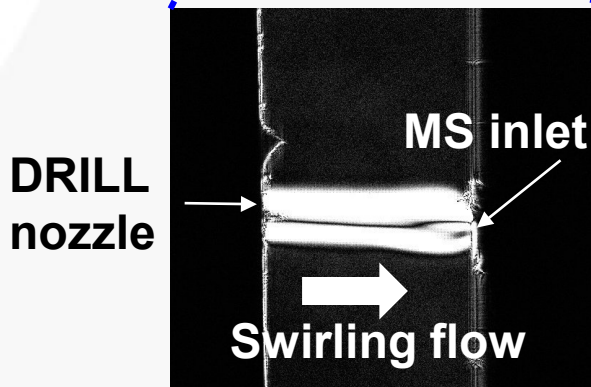
- Exploits centrifugal effects of a swirling flow for size-selective separation of electrosprayed droplets
- Enables sampling of the most analytically “valuable” small droplet/ ion populations into the mass spectrometer.
- Improves signal-to-noise, sensitivity, and limit-of-detection

Kottke, P.A., et al., *DRILL: An Electrospray Ionization-Mass Spectrometry Interface for Improved Sensitivity via Inertial Droplet Sorting and Electrohydrodynamic Focusing in a Swirling Flow*. Analytical Chemistry, 2017. **89**(17): p. 8981-8987.

# DRILL swirling flow selectively transmits only small droplets & “dry” ions into MS

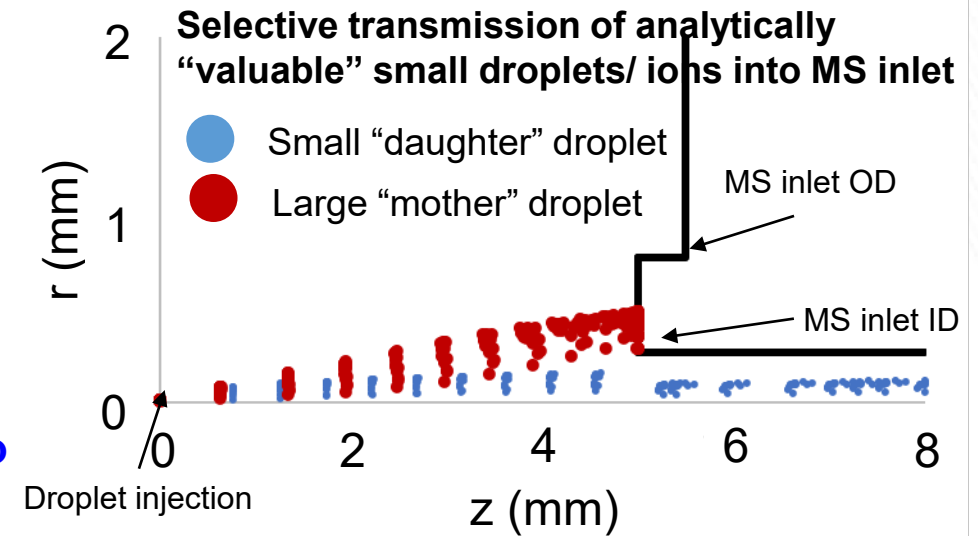


- DRILL swirling gas flow enables droplet-size separation advantageous for analytical studies
- Centrifugal effects cause solvated larger droplets to move away from MS inlet and smaller droplets/ “dry” ions to enter MS without loss!

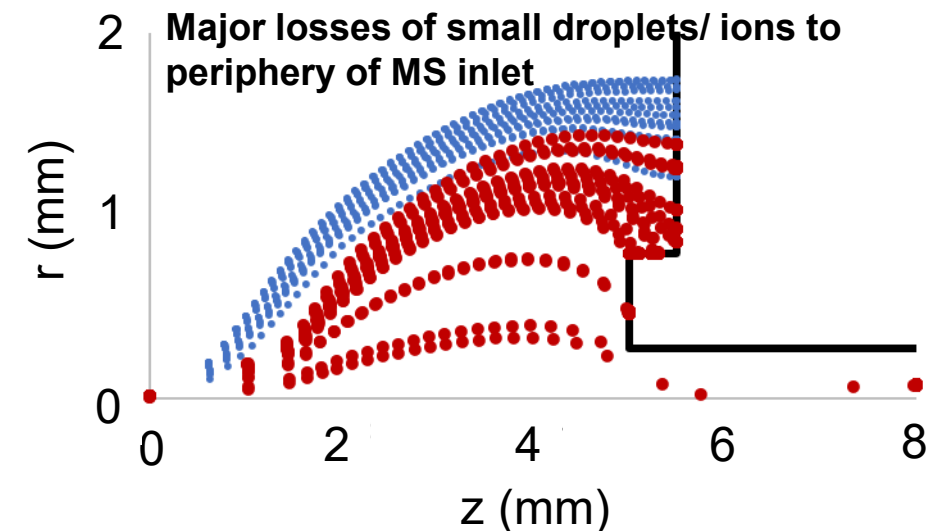


DRILL swirling flow is completely transmitted into MS inlet allowing for lossless collection of small droplet/ ion populations into MS

## DRILL-ESI-MS



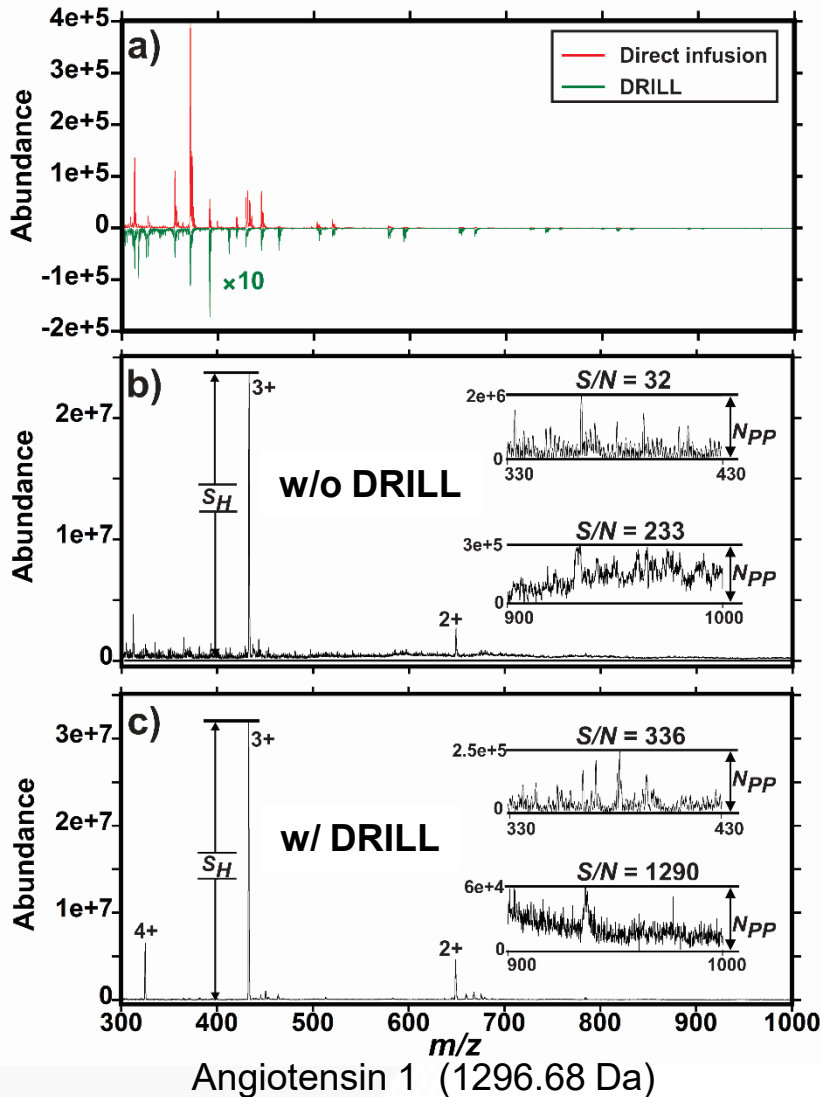
## Standard ESI-MS



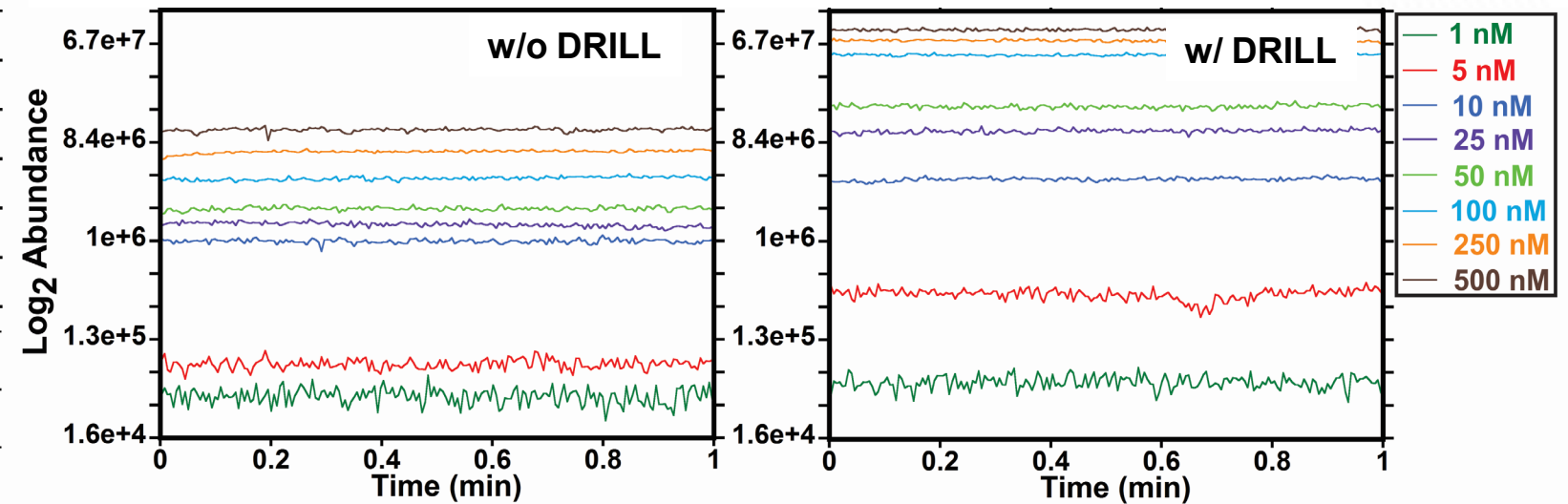
# 10X Improved Signal-to-Noise Ratio, Sensitivity, and Limit-of-Detection

Kottke, P.A., et al., *DRILL: An Electrospray Ionization-Mass Spectrometry Interface for Improved Sensitivity via Inertial Droplet Sorting and Electrohydrodynamic Focusing in a Swirling Flow*. Analytical Chemistry, 2017. **89**(17): 8981

## Signal-to-Noise Ratio



## Sensitivity Enhancement



## Limit-of-Detection

