

Abstract Submitted
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A simultaneous charge and size measurement method for individual airborne particles using digital holographic particle imaging¹ ADAM HAMMOND, ZHONGWANG DOU, ZACH LIANG, HUI MENG, University at Buffalo SUNY — Recently, significant inquiry to understand the effects of particle charge on particle laden flow have been made, particularly in the study of Lagrangian particle-pair statistics. Quantification of individual particle charge allows relation of inter-particle electric forces and turbulence-induced forces. Here we offer a simultaneous, individual particle charge and size measurement technique utilizing in-line digital holographic Particle Tracking Velocimetry (hPTV). The method measures particle electric mobility through its velocity response within a uniform electric field using a sequence of holograms, next the particle diameter is measured with the same holograms using a matched-filter developed by Lu et al. (2012) as an input for calculation of charge. Consequently, a benefit of this method is that particle charge is calculated on the individual level, versus a mean charge calculated from a group of particles, offering improved estimations of charge distributions for studies of particle laden flow.

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