

Abstract Submitted  
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**A Near-field Comparison of Flows at Similar Momentum Ratios in a Co-Flow Airblast Atomizer**<sup>1</sup> THOMAS J. BURTNETT, TIMOTHY B. MORGAN, DANYU LI, JULIE K. BOTHELL, THEODORE J. HEINDEL, Iowa State University, ALBERTO ALISEDA, NATHANAEL MACHICOANE, University of Washington, ALAN L. KASTENGREN, Argonne National Laboratory, EXPERIMENTAL MULTIPHASE FLOW LAB TEAM — Spray atomizers can be found in a wide variety of applications, from combustion systems to nasal inhalers. Capturing the dynamics of sprays and their formation in the near-field region are often challenging due to their optically dense nature. In this study, a co-flow airblast atomizer was used to disperse a stream from an inner liquid needle. Gas and liquid flow rate combinations were varied to achieve conditions with similar gas-liquid momentum ratios. The high-resolution X-ray capabilities at the Advanced Photon Source at Argonne National Laboratory were used to characterize the near-field spray formation region. Quantitative results from focused-beam X-ray measurements, such as the fluid's equivalent path length (EPL), were determined and compared for various momentum ratios. Similar momentum ratios provided similar EPL measures in selected regions, even while the gas and liquid Reynolds numbers were varied. Regions where differences appeared for the same momentum ratio are also identified and discussed.

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Thomas Burnett  
Iowa State University

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