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Influence of bubble size on effervescent atomization. Part 2: unsteady spatial and temporal features THOMAS SHEPARD, DAVID FORLITI, TAYLOR LEWIS, University of St. Thomas — In this work, high-speed images of the near-nozzle exit of an effervescent atomizer operating at low gas to liquid ratios are examined using proper orthogonal decomposition and digital image analyses. These techniques allow for the extraction of coherent spatial and temporal patterns present in the high-speed image sets. The effervescent atomizer was operated in the bubbly regime and the experimental facility allowed independent control over bubble size. The impact of varying the mean bubble size on the atomizer near exit field is presented at multiple gas to liquid flow rate ratios. The results demonstrate an influence of mean bubble diameter on peak instability frequency, instability amplitude, axial convection velocities and dominant mode structure.

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