

Abstract Submitted
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2D X-ray Radiography and 3D Computed Tomography of a Spray¹ DANYU LI, THEODORE J. HEINDEL, Iowa State University, EXPERIMENTAL MULTIPHASE FLOW LAB TEAM — X-ray computed tomography can provide a comprehensive three-dimensional time-average view of a spray with clear internal details. Compared with general X-ray radiography, however, it is time-consuming and the 3D reconstructions require specialized imaging tools. For axisymmetric sprays, it is possible to calculate the 3D density distribution from the 2D X-ray radiographs. In this research, broadband tube source X-rays were used to take 2D radiographs of a spray from a two-fluid coaxial atomizer. To enhance image contrast, 20% potassium iodide by mass was added to the water. Based on the circular symmetry of the spray, an Abel inversion was used to analyze the time-average radial density distribution of the spray. X-ray computed tomography was also used to quantify the internal structure and the radial density distribution of the identical spray. The results of the two were compared and show good agreement as long as the spray is axisymmetric.

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