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Tomographic Background Oriented Schlieren using Plenoptic Cameras JENNA DAVIS, Auburn University, CHRISTOPHER CLIFFORD, U.S. Air Force Research Laboratory, DUSTIN KELLY, BRIAN THUROW, Auburn University — Tomographic background oriented schlieren (BOS) is a novel technique used to reconstruct the three-dimensional (3D) density or refractive index field in a compressible flow. A four-camera plenoptic BOS experiment was designed to perform a systematic study of varying length scale features in a 3D flow and their influence on the final tomographic reconstruction of a volumetric refractive index field. Solid transparent cylinders were submerged in a nearly refractive index matched solution to act as features within a static flow. This well-controlled experiment varied the cylinder size, separation distance between cylinders, and position with respect to the four-camera configuration. Final reconstructions aim to: (1) determine the separation distance limit between the two features before they can no longer be individually resolved, (2) observe how the separation distance changes as a function of cylinder size and position, and (3) compare the performance of the reconstruction as a function of how many viewing angles were used. Such results will provide both the schlieren and compressible flow communities with a better understanding of what limitations might be present in a final reconstruction with respect to the interference of features across a wide range of length scales.

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