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3D Spray Droplet Distributions in Sneezes ALEXANDRA TECHET, BARRY SCHARFMAN, LYDIA BOUROUIBA, Massachusetts Institute of Technology — 3D spray droplet clouds generated during human sneezing are investigated using the Synthetic Aperture Feature Extraction (SAFE) method, which relies on light field imaging (LFI) and synthetic aperture (SA) refocusing computational photographic techniques. An array of nine high-speed cameras are used to image sneeze droplets and tracked the droplets in 3D space and time (3D + T). An additional high-speed camera is utilized to track the motion of the head during sneezing. In the SAFE method, the raw images recorded by each camera in the array are preprocessed and binarized, simplifying post processing after image refocusing and enabling the extraction of feature sizes and positions in 3D + T. These binary images are refocused using either additive or multiplicative methods, combined with thresholding. Sneeze droplet centroids, radii, distributions and trajectories are determined and compared with existing data. The reconstructed 3D droplet centroids and radii enable a more complete understanding of the physical extent and fluid dynamics of sneeze ejecta. These measurements are important for understanding the infectious disease transmission potential of sneezes in various indoor environments.

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