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Turbulent Eddies in a Compressible Jet in Crossflow Measured using Pulse-Burst PIV STEVEN BERESH, JUSTIN WAGNER, JOHN HENFLING, RUSSELL SPILLERS, BRIAN PRUETT, Sandia National Laboratories — Pulse-burst Particle Image Velocimetry (PIV) has been employed to acquire time-resolved data at 25 kHz of a supersonic jet exhausting into a subsonic compressible crossflow. Data were acquired along the windward boundary of the jet shear layer and used to identify turbulent eddies as they convect downstream in the far-field of the interaction. Eddies were found to have a tendency to occur in closely-spaced counter-rotating pairs and are routinely observed in the PIV movies, but the variable orientation of these pairs makes them difficult to detect statistically. Correlated counter-rotating vortices are more strongly observed to pass by at a larger spacing, both leading and trailing the reference eddy. This indicates the paired nature of the turbulent eddies and the tendency for these pairs to convect through the field of view at repeatable spacings. Velocity spectra reveal a peak at a frequency consistent with this larger spacing between shear-layer vortices rotating with identical sign. Super-sampled velocity spectra to 150 kHz reveal a power-law dependency of -5/3 in the inertial subrange as well as a -1 dependency at lower frequencies attributed to the scales of the dominant shear-layer eddies

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