Abstract Submitted
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Investigation of the shear-layer instabilities in supersonic impinging jets using double-PIV measurements.[1] TUSHAR SIKRORIA, Department of Mechanical Engineering, University of Melbourne, Parkville 3010, Australia, JULIO SORIA, LTRAC, Department of Mechanical and Aerospace Engineering, Monash University, Clayton 3800, Australia., RICHARD SANDBERG, ANDREW OOI, Department of Mechanical Engineering, University of Melbourne, Parkville 3010, Australia — The fundamental study of the phase-locked flow in supersonic impinging jets, generating strong resonance tones due to the presence of aero-acoustic feedback loop, is important for the aerospace propulsion and other industrial applications. While the shear-layer characteristics in such flows has been experimentally explored in various research studies using time-unresolved particle image velocimetry (PIV) technique, the understanding is limited due to the absence of temporal information. Due to the small time-scales associated with supersonic flows, the time resolved PIV measurements require a large bandwidth, which is challenging for the current state of the technology. An alternate approach using time unresolved double-PIV measurements is presented in the current study, which can generate multiple samples of dual-time data. The application of techniques like dynamic mode decomposition (DMD) on such data is shown to provide valuable information about the frequencies and the associated flow structures involved in the aero-acoustic feedback loop.

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