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Fluidic-Driven Ducted Heat Ejector D. GERTY, R. MAHALINGAM, A. GLEZER, Georgia Institute of Technology — Unsteady, small-scale fluid mechanics and heat transport processes within a high-aspect ratio ducted heat ejector are investigated experimentally. The ducted heat ejector exploits the flow that is induced within the channel by the motion of a vibrating reed to cool the inner surfaces of the duct walls and thereby transport heat across its boundaries to cool electronic hardware by direct contact. This cooling approach is particularly attractive for low-power, densely-packed electronic hardware where heat is removed by direct conduction through the duct walls. The time harmonic motion of the reed results in the regular shedding of nominally two-dimensional counter-rotating vortical structures and induces a net flow through the duct. The flow characteristics are investigated using high-resolution particle image velocimetry (PIV). Of particular interest is the effect of the induced, small-scale motions and enhanced mixing on heat transfer across the duct boundaries which is comparable to conventional time-invariant channel flows at higher Reynolds numbers.

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