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Modifying formation and merging of shear-layer vortices using local periodic heating[1] CHI-AN YEH, PHILLIP MUNDAY, KUNIHIKO TAIRA, Florida State University — The flow physics of a thermally forced shear layer downstream of a finite-thickness splitter plate is examined with 2D compressible DNS. Unsteady forcing is introduced at the tip of the plate with an oscillatory heat flux boundary condition. We observe that the forcing can introduce small-level oscillatory surface vorticity flux and generates volumetric baroclinic vorticity at the actuation frequency in the vicinity of the tip, which in turn is able to modify the vortex dynamics of the shear layer downstream. When using forcing frequency near the first subharmonic of the baseline flow, the strength of each roll-up vortex appears to have greater fluctuation, with its mean remaining unchanged from that of the baseline. The fluctuation added to each vortex leads to a wider shear layer by either encouraging the vortex deviating from the centerline while convecting downstream, or encouraging the merging process to take place earlier upstream. When forcing excites the roll-up and lock the roll-up frequency onto that of actuation, the mean strength of the vortices can be accordingly modified by controlling the amount of vorticity fed into each formed vortex. Consequently, the modified strength alters the shear layer thickness while vortices convecting along the centerline. Steady forcin

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