Abstract Submitted
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**Time resolved measurements of the pressure field generated by vortex-corner interactions in a cavity shear layer**[1] XIAOFENG LIU, JOSEPH KATZ, Johns Hopkins University — A 2D open cavity shear layer flow, especially its interaction with the trailing corner of the cavity, was investigated experimentally in a water tunnel at a Reynolds number of $3.8 \times 10^4$. Time-resolved PIV with an image sampling rate of 4500 fps and a field of view of $25 \times 25$mm was used to simultaneously measure the instantaneous velocity, material acceleration and pressure distribution. The pressure was obtained by spatially integrating the material acceleration (Liu and Katz, Exp Fluids 41:227-240). A large database of instantaneous realizations enables detailed visualization of the dynamic changes to shear layer vortices, such as deformation, breakup and trapping as they impinge and climb over the cavity trailing corner. These phenomena dominate the high pressure fluctuations near the corner, e.g. formation of a pressure minimum as the vortex is trapped on top of the corner. Ongoing statistical analysis examines the turbulence variables, focusing in particular on pressure-velocity and pressure-rate-of-strain correlations and their impact on the TKE balance.

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