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**Measurement of Pressure-Rate-of-Strain, Pressure Diffusion and Velocity-Pressure-Gradient Tensors around an Open Cavity Trailing Corner**[1] XIAOFENG LIU, JOSEPH KATZ, Johns Hopkins University — A non-intrusive measurement technique that is capable of simultaneously measuring the instantaneous velocity, material acceleration and pressure distribution over a sample area has been applied to measure the pressure related turbulence statistics of a shear layer flow around the trailing corner of a 2D open cavity. This technique utilizes four-exposure PIV to measure the distribution of material acceleration, and integrating it by means of circular virtual boundary omni-directional algorithm to obtain the instantaneous pressure distribution. Results based on 13600 instantaneous flow field measurement samples enable direct estimates of components of the pressure-rate-of-strain, pressure diffusion and velocity-pressure-gradient tensors. Analysis of error propagation and comparisons between these terms indicate that the results are reliable. In the cavity shear layer, the pressure-rate-of-strain term R11 is mostly negative while R22 is positive but with smaller magnitude, implying that the streamwise turbulent energy is redistributed to the lateral direction. Conventional pressure-strain turbulence models are also compared with the measurement data.

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Xiaofeng Liu
Johns Hopkins University

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