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Pressure and velocity field measurements of pulsating flow in a square channel y-junction MARKUS PASTUHOFF, ATHANASIA KALPAKLI, P. HENRIK ALFREDSSON, CCGEx, KTH Mechanics — The pressure and velocity fields in a y-junction of a square (40×40 mm^2) cross-section channel were investigated during pulsating flow. One of the sides of the channel was covered with fast responding pressure sensitive paint (PSP) whereas the velocity field at the channel center parallel to the PSP surface was measured using particle image velocimetry (PIV). The flow conditions, in terms of mass flow rate and pulsation frequency, were selected to resemble the flow inside an exhaust manifold of a small internal combustion engine, although the gas was at room temperature. The mass flow was varied between 10 and 130 g/s with pulsations between 0 and 80 Hz. For both the PSP and the PIV measurements images were acquired unsynchronized to the pulses using a high-speed camera and phase averages were formed *a posteriori*. The use of PSP together with PIV demonstrates how the two techniques can be used to verify and complement each other, PIV excelling at the lower mass flow rates and PSP at the higher. It is shown that the signal-to-noise ratio for PSP at low velocities can be enhanced using a technique based on singular value decomposition.[1]

[1]Pastuhoff, M., Yorita, D., Asai, K. & Alfredsson, P.H. 2013 *Meas. Sci. Technol.* **24**, 075301.

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