

Abstract Submitted  
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**Flow over a backward-facing step: Mean separation bubble and evolution of coherent structures** PANKAJ NADGE, RAGHURAMAN GOVARDHAN, Indian Institute of Science — We present PIV measurements downstream of a backward-facing step at large step based Reynolds numbers. The structure of the mean separation bubble is mapped in detail, and the effect of Reynolds number and expansion ratio (ER) on it is studied; the ER being the primary geometrical parameter for this configuration. These measurements show that there exists a mean separation bubble structure that is nearly independent of ER at large Re. Further, these measurements permit evaluation of the forces acting on the mean separation bubble in the streamwise direction due to the Reynolds stresses. Towards understanding the coherent structures in the flow downstream of the step, time-resolved PIV measurements have been performed in a plane parallel to the lower wall. These show the presence of counter-rotating vortical structures, which may be thought of as signatures of three-dimensional hairpin-like structures. These counter-rotating pairs are observed to evolve as they convect downstream. Conditional averaging of these counter-rotating structures show that their length-scale increases with streamwise distance. Details about these structures and their evolution will be presented at the conference.

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