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Ghost Particle Velocimetry implementation in millimeters devices and comparison with μPIV MARCO RICCOMI, University of Pisa, FEDERICO ALBERINI, University of Birmingham, ELISABETTA BRUNAZZI, University of Pisa, DANIELE VIGOLO, University of Birmingham — Micro/milli-fluidic devices are becoming an important reference for several disciplines and are quickly increasing their applications in scientific, as well as industrial, environment. As a consequence, the development of techniques able to analyse these kinds of systems is required to allow their progress. Here we show the implementation of the Ghost Particle Velocimetry (GPV) for the flow velocity field investigation in milli-fluidic devices. This innovative technique has been recently introduced, and has been already proven to be useful in describing rapid phenomenon at a small scale. In this work, the GPV has been used to characterize the trapping of light suspended material in a branching junction. Experiments have been performed to identify the flow velocity field close to a millimeters scale T-junction, at different Reynolds numbers. Particularly interesting are the complex structures, such as vortices and recirculation zones, induced by the vortex breakdown phenomenon. The results obtained have been deeply validated and compared with the well-established μPIV, highlighting the differences in terms of qualitative and quantitative parameters. A performance comparison has been designed to underline the strengths and weaknesses of the two experimental techniques.

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