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**Validation of LES predictions with Microscopic Particle Image Velocimetry in an axial symmetric Confined Impinging Jets Reactor**  
EMMANUELA GAVI, Iowa State University, IA, MATTEO ICARDI, DANIELE MARCHISIO, Politecnico di Torino, Italy, MICHAEL G. OLSEN, RODNEY O. FOX, Iowa State University, IA, DJAMEL LAKEHAL, ASCOMP GmbH — Micromixer devices, such as the Confined Impinging Jets Reactor (CIJR) are under study, in particular for micro- and nanoparticles precipitation processes. In this work the flow field in an axial symmetric CIJR was studied by means of microscopic Particle Image Velocimetry (microPIV), an innovative experimental technique that allows to measure the instantaneous flow field over a global domain. Experimental measurements were carried out at four flow rates, ranging from quasi-steady laminar to unsteady turbulent regime. To the authors knowledge this work is the first one to report experimental microPIV data on an axial symmetric microscopic device. Measurements were then employed to validate predictions obtained with Large Eddy Simulation (LES). CFD results were able to reproduce the instability of the flow observed in the CIJR and a good quantitative agreement is found for both the mean velocity components and the fluctuations. An interesting result of this study is the understanding of the necessity of mimic the pumping instability in LES simulations of the CIJR, by imposing appropriate inflow boundary conditions, which contribute to determine the unsteady behavior of the flow.

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