

Abstract Submitted  
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**In-Cylinder Flow Through An Internal Combustion (IC) Engine<sup>1</sup>**

SAMIRA KHAN, University of Oklahoma, KENDRICK GIBSON, PAULIUS PUZINAUSKAS, YONGLI QI, University of Alabama — IC engine performance is strongly influenced by large-scale in-cylinder motion developed during the intake process. This work was part of a larger effort to characterize and augment in-cylinder flow structures to improve lean limit and exhaust gas recirculation tolerance. Ultimately the flow structures are to be characterized with unsteady computational fluid dynamics (CFD) calculations. This study provided digital particle image velocimetry (DPIV) flow visualization data under steady conditions to improve the calibration of the CFD work. An engine cylinder head was mounted on a transparent cylinder with a fixed piston. Air was drawn through using a steady flow bench, and DPIV images were obtained from the cylinder. Measurements were made at four suction pressures and four valve lift to diameter ratios for a total of sixteen cases. After initial measurements, intake port modifications were made to enhance tumble. The modifications created more definitive tumble flow.

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