

Abstract Submitted
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Time-resolved stereoscopic PIV study of flashback in swirl flames at elevated pressures RAKESH RANJAN, DOMINIK EBI, NOEL CLEMENS, University of Texas at Austin — Boundary layer flashback of turbulent premixed swirl flames can pose a major challenge to the operation of stationary gas turbines, especially with hydrogen-rich fuels. To improve our understanding of the physics behind this phenomenon at gas turbine relevant conditions, it is essential to investigate flashback at elevated pressures. With this purpose in mind, flashback experiments with hydrogen/methane-air premixtures are conducted in a model swirl combustor installed in an optically accessible high-pressure combustion facility. We have employed stereoscopic PIV in conjunction with high speed chemiluminescence imaging to study the upstream propagation of the flame in the premix tube during flashback. Experiments are run at pressures ranging from 1 atm to 5 atm. These time-resolved measurements provide valuable insight into the flame-flow interaction during flashback at elevated pressures.

Rakesh Ranjan
University of Texas at Austin

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