

Abstract Submitted  
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**The effect of stratification on premixed swirl-flame flashback by using porous center-body injection**<sup>1</sup> ANDREW MCCASLIN, RAKESH RANJAN, NOEL CLEMENS, Univ of Texas, Austin — Boundary layer flashback must be prevented in order to stably operate stationary gas turbines. One strategy to avoid flashback is to create equivalence-ratio stratification, such as by reducing the fuel/air ratio in the boundary layer below the flammability limit. Typically, stratification is achieved by using radially non-uniform fuel injection. The goal of the current study is to reduce the propensity of flashback in a premixed annular swirl combustor that uses a premix section with center-body. A porous metal center-body (10 micron pore size) is used to bleed air directly into the boundary layer and thus locally reduce the equivalence ratio. Planar laser-induced fluorescence imaging of anisole-seeded flow is carried out to assess the stratification in the flow. Time-resolved PIV and chemiluminescence imaging are used to investigate flashback at atmospheric pressure conditions. A comparative study between fully premixed and stratified flame flashback is conducted to determine how stratification influences flashback physics.

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