

Abstract Submitted  
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**Flow Diagnostics of Swirl Stabilized Combustion with and without Porous Inert Media**<sup>1</sup> CAROLINA VEGA RECALDE, Oklahoma State University, AJAY AGRAWAL COLLABORATION, JOSEPH MEADOWS COLLABORATION, ZACHARY SMITH COLLABORATION, JOHN KORNEGAY COLLABORATION — Due to regulations, the industry and the scientific community have become interested in combustion noise and thermo-acoustic instabilities, especially those produced under lean-premixed (LPM) conditions. Instabilities are self-excited and arise when energy from combustion is added to the system faster than energy is dissipated by heat transfer. Given that porous inert media (PIM) has been shown to mitigate combustion noise and thermo-acoustic instabilities in lean direct injection (LDI) using kerosene fuel, the present study examined the flow fields produced with and without PIM. By using time-resolved particle image velocimetry (TR-PIV) and proper orthogonal decomposition (POD) techniques, the non-reacting and reacting flow fields will be studied to determine the underlying mechanisms. The purpose of this experiment is to gain more understanding of how this PIM material works. Since PIM has been shown to reduce these instabilities, modifications to combustors can be made to make them more efficient and safe for the environment.

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