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Flame Position-Shear Layer Offset Effects on Jet in Crossflow Dynamics[1] VEDANTH NAIR, VISHAL ACHARYA, TIM LIEUWEN, Georgia Institute of Technology — The dynamics and mixing behavior of Reacting Jet in Crossflow systems can be studied by considering the behavior of coherent structures and their formation and growth. This study aims to understand the influence of heat-release on the growth of shear layer vortices (SLV) for a non-premixed, reacting jet in crossflow (RJICF) configuration. Two reacting cases are considered: pure methane jet into a crossflow of air (flame lies outside the jet shear layer) and a diluted methane jet into a crossflow of oxygen (flame lies inside), in order to gauge the influence of changing the location of heat release with respect to the shear layer. These two configurations lead to significant differences in the spatial orientation of shear-heat release interactions and how the vorticity interacts with regions on the other side of the jet. The results demonstrate that the presence of heat release in the near field has a suppressive effect on shear layer growth as well as the development of the counter-rotating vortex pair (CVP) and this effect is amplified in the case where the flame is moved inside the shear layer.

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