

Abstract Submitted  
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**Diffuse interfacelets in transcritical flows of propellants into high-pressure combustors**<sup>1</sup> JAVIER URZAY, LLUIS JOFRE, Center for Turbulence Research, Stanford University — Rocket engines and new generations of high-power jet engines and diesel engines oftentimes involve the injection of one or more reactants at subcritical temperatures into combustor environments at high pressures, and more particularly, at pressures higher than those corresponding to the critical points of the individual components of the mixture, which typically range from 13 to 50 bars for most propellants. This class of trajectories in the thermodynamic space has been traditionally referred to as transcritical. Under particular conditions often found in hydrocarbon-fueled chemical propulsion systems, and despite the prevailing high pressures, the flow in the combustor may contain regions close to the injector where a diffuse interface is formed in between the fuel and oxidizer streams that is sustained by surface-tension forces as a result of the elevation of the critical pressure of the mixture. This talk describes progress towards modeling these effects in the conservation equations.

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