

Abstract Submitted
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Fluid dynamics in a Rotating-Detonation-Engine with micro-injectors¹ DOUGLAS SCHWER, Naval Research Laboratory — Rotating detonation engines (RDE's) represent a natural extension of the extensively studied pulse detonation engines (PDE's) for obtaining propulsion from the high efficiency detonation cycle. RDE's require fuel and oxidizer under high pressure to be injected through micro-nozzles from one or two plenums (for premixed and non-premixed). This injection process is critically important to the stability and performance of the RDE. This paper studies the effect of this injection process on the detonation wave within the combustion chamber, with an emphasis on how the fluid dynamics are affected. Both two-dimensional and three-dimensional simulations are done using well proven numerical methods for both the combustion chamber and mixture plenums of an idealized RDE.

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