

Abstract Submitted
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Rayleigh-Taylor Unstable Flames – Fast or Faster?¹ ELIZABETH HICKS, Northwestern University — The speed of a Rayleigh-Taylor unstable, pre-mixed flame could plausibly be influenced by both the Rayleigh-Taylor instability of the flame front and the turbulence generated by the flame itself. Both of these mechanisms stretch and wrinkle the flame front, increasing its surface area and speed. But which of these two processes is dominant? Is the flame speed better modeled by the Rayleigh-Taylor speed or the root-mean-square velocity of the turbulence? To address these questions, we will present the results from three-dimensional, direct numerical simulations of Rayleigh-Taylor unstable flames that generate moderately turbulent conditions. We will discuss the influence of the Rayleigh-Taylor instability and turbulence on the flame front and focus on cases for which the flame speed substantially exceeds the laminar flame speed.

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