

Abstract Submitted
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Intermittency in Premixed Turbulent Reacting Flows¹ PETER
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oratory — Characterizing the intermittency of velocity gradient and scalar gradient
fields in turbulent reacting flows is important for developing a better understanding
of the interactions between turbulence and flames. Here we examine intermittency
in premixed reacting flows using numerical simulations of stoichiometric hydrogen-
air combustion at a range of turbulence intensities. Simulations of homogeneous
isotropic turbulence with a nonreacting passive scalar are also carried out in order
to allow comparisons with the reacting flow results. We examine intermittency by
calculating probability density functions and moments of the local enstrophy, energy
dissipation rate, and scalar dissipation rate. Conditional analyses based on local,
instantaneous values of the reactant mass fraction are used to study variations in the
statistics through the flame. We observe variations in the intermittency depending
on the intensity of the turbulence, the location in the flame, and the quantity under
consideration. We discuss the implications of these results for the flame structure,
and also provide an explanation for the observed results by considering the two-way
interactions between turbulence and premixed flames.

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