

Abstract Submitted
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Direct numerical simulations of reacting boundary layers¹ LIAN DUAN, M. PINO MARTIN, Princeton University — Direct numerical simulations (DNS) of turbulent boundary layers²³ show that there is a strong coupling between temperature fluctuation and chemical composition. Small temperature fluctuations result in large fluctuations in the chemical composition of the gas. The maximum fluctuation levels occur when the reactions are exothermic, right at the surface, where the coupling with the surface chemistry is important. In this work, we conduct DNS of reacting turbulent boundary layers, including non-catalytic, partially catalytic and fully catalytic wall conditions, and we explore the feedback mechanisms between the surface reactions at the wall, near-wall gas phase chemistry, and turbulent boundary layer.

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²Martín & Candler, *Phys. Fluids*, vol. 10, pp. 11715-1724, 1998

³Martín & Candler, AIAA Paper 2001- 2717

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