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Reduced-order modeling of flame transfer functions with transverse acoustic modulation ZHENG QIAO, YU LV, Mississippi State Univ — The study presents a G-equation based reduced-order model for predicting the flame transfer function (FTF) with transverse acoustic modulation. A novel two-step approach is employed in this model: first, a steady-flame profile, which is obtained via detailed simulation, is employed to predict the linear mode-shape of the flow field; and then the simulation based on the G-equation is carried out to capture the dynamic behavior of the flame accurately. The main advantage of this method is that the flame profile in the nontrivial aerodynamic environment can be precisely replicated, and the flame dynamic is predicted under the physically-consistent flow modulation mode. In the present work, we demonstrate the efficacy of our model with the consideration of a premixed Bunsen flame, and the comparison of our predictions with the DNS simulation results will be discussed in detail.

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