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Quantification of multiple types of uncertainties in the HyShot II scramjet JOHAN LARSSON, MICHAEL EMORY, PAUL CONSTANTINE, NICOLAS KSEIB, JAVIER URZAY, FRANCISCO PALACIOS, CATHERINE GORLE, GIANLUCA IACCARINO, Stanford University — The talk describes a collaborative effort at quantifying the effects of different types of uncertainties on the pressure rise in the HyShot II scramjet combustor. These uncertainties include the shock-tube conditions (mean and turbulent state, angle-of-attack), the chemical reaction rates in the hydrogen-air chemistry, and errors in the assumed stress-strain relationship in the RANS turbulence model. A physics-based strategy for dimensional reduction is used to make the study computationally feasible. Results include the ranking of different types of uncertainties.

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