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Detailed Simulations and Analysis of Shock Bifurcation YONG SUN, MATTHIAS IHME, Aerospace Engineering, University of Michigan, RALF DEITERDING, Oak Ridge National Laboratory — The interaction between the reflected shock wave and the boundary layer, that is formed by the incident shock, leads to shock bifurcation. This interaction induced inhomogeneities in the flow-field behind the reflected shock, and thereby affecting the combustion process in shock-tube ignition studies. To quantify effects of shock-bifurcation on the region behind the reflected shock, detailed simulations of a shock-tube system at high-pressure conditions are performed under consideration of detailed hydrogen reaction chemistry. Both 2D and 3D simulations are performed, and simulation results are compared against experiments and low-order shock-bifurcation models. To isolate relevant physical processes, additional simulations for different operating conditions, mixture-compositions, and adiabatic and isothermal walls are conducted, and results of this investigation are discussed in this presentation.

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