

4D07: EXPERIMENTAL STUDY AND MODELING OF SHOCK TUBE IGNITION DELAY TIMES FOR HYDROGEN-OXYGEN-ARGON MIXTURES AT LOW TEMPERATURES.

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In some of your experiments there is a preignition pressure rise indicating the gas "knows" about it in advance of the coming ignition. Isn't this something to worry about? What do you think it is due to and what effect might it have?

Reply by Genny Pang

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Our paper discusses several hypotheses for the cause of this pressure rise in some of our experiments, including the likelihood of energy release (i.e. chemical reaction) occurring earlier at axial locations other than our measurement position. A consequence of such energy release is pressure waves traveling to the measurement location. The effect of the pressure rise, and its corresponding temperature change, is to accelerate the kinetics leading to the ignition event at our measurement location. These effects of pressure and temperature perturbations are included in our modeling using CHEMSHOCK. We are currently working to improve our understanding of these issues both experimentally, including the use of additional diagnostics at multiple shock tube locations (end wall and multiple axial position), and computationally, with a detailed one-dimensional chemically reacting computational fluid dynamics solver.