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VISUALIZATION RESULTS OF HYDROGEN IGNITION IN SHOCK TUBES

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The application of optical methods for visualization of ignition processes makes possible to determine the details of physical and chemical processes that accompany combustion phenomena. In some cases this allows to correct the mistakes that appear due to the application of other measurement techniques (spectroscopy, pressure/temperatures recording, etc.). From this point of view the visualization of the effect of the physical-chemical processes on external gas-dynamical properties at the self-ignition of the fuel (gaseous or atomized) in gaseous oxidizer flow (air or oxygen) is very important.

The understanding of hydrogen combustion has an essential significance for the development of prospective gas turbines and engines. In the present lecture we consider the results of optical investigations of the intriguing phenomenon of hydrogenous mixture self-ignition behind reflected shock wave. Brief historical review of the traditional shock-tube optical studies will serve as a basis for detailed analysis of recent investigations including amazing pictures of hydrogen-air ignition under shock focusing, as well as the low-temperature ignition under over-tailored conditions.