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Multi-point microwave discharge in methane-air gases induced by pulsed microwave power CHENG LIU, GUIXIN ZHANG, HONG XIE, Electrical Engineering, Tsinghua University — Application of microwave plasma offers a promising method to induce faster combustion in internal combustion engine. In this study, microwave multi-point discharge and ignition had been confirmed via high-speed schlieren imaging technique in methane-air gases. The experiment was implemented with the microwave resonant ignition system and the schlieren optical system. 2ms-3000W-2.45GHz microwave pulse was employed as the ignition energy source to produce micro-discharge and initial flame kernel in the combustion chamber. The reflected schlieren imaging was used to present the flame development process with a high speed camera. A quartz glass coated with indium tin oxide (ITO), which ensured the sufficient microwave reflection characteristics and light transmission respectively, was used as the bottom of the microwave resonant chamber. Ignition experiments were conducted at high pressure of 2 bars of stoichiometric methane-air gases. It can be seen that in schlieren images that flame kernels were generated at more than one location simultaneously and flame propagated with different speeds in the combustion chamber. And, the number and the location of discharge was investigated in the experiment.

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