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Ignition and propagation of premixed methane flame by successive laser-induced breakdowns LYDIA WERMER, Worcester Polytechnic Institute, MOON SOO BAK, Sungkyunkwan University, SEONG-KYUN IM, Worcester Polytechnic Institute — The ignition and the propagation of premixed methane flame by two successive laser-induced breakdowns were investigated. The ignition and flame propagation were visualized using a high-speed schlieren imaging technique. Experiments were performed for various time intervals between the two pulses ranging from nanoseconds to milliseconds and were compared to the ignition by a single laser breakdown. For time intervals in the nanosecond range, the second pulse energy coupled with the first breakdown increasing energy absorption in the breakdown. For time intervals in the microseconds and milliseconds, the blast wave from the second breakdown interacted with the propagating flame induced by the first breakdown. The interaction triggered Richtmyer-Meshkov instability enhancing flame propagation. It is observed that there are time intervals inhibiting the second breakdown due to the heating either by the first breakdown or by combustion.

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