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Study of interaction of hot core plasma sources and micro-shock waves[1] LEELA CHELIKANI, SUMAN BAGCHI, PREM KIRAN PATURI, None
— Laser Induced Shockwaves (LISWs) have many applications from material processing to therapeutics. In almost all the processes and applications, understanding the conversion of laser energy to kinetic energy propagating as a shockwave (SW) is essential. We present the results on interaction of multiple plasma sources leading to SWs generated using Nd:YAG laser pulses (532 nm, 7 ns) (a) in atmospheric air and (b) from 1-D periodic structured surfaces (PSS) of 30 μm depth and 240 $\pm$ 20 μm diameter having 25 and 64 lpi (lines per inch). Using time resolved shadowgraphy the novel aspects of (1) the presence of two distinct sources of ionization along the laser propagation direction modifying the nature of SWs around the focal plane and (2) the interaction of these two sources leading to the transition of hot core plasma in air analogous to that of a cavitation bubble in fluids are presented. Analogous phenomena of modification SW nature were observed from 1-D PSS. The effect of surface modulation on the SW and Contact Front dynamics was compared from that of a flat surface (FS). The initial studies in two different media indicate the possibility to control the SWs, either accelerate or decelerate by varying the plasma dynamics.

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