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Numerical Simulation of Laser Ablative Shock Waves From Aluminum in Presence of Helium Gas At Different Ambient Pressures[1] PREM KIRAN PATURI[2], P S L KAMESWARI DURVASULA, SAI SHIVA S, ACRHEM, University of Hyderabad, ACRHEM, UNIVERSITY OF HYDERABAD TEAM —
A two dimensional comparative study of Laser Ablative Shock Wave into the Aluminum target in the presence of Helium gas at different ambient pressures over a range of 690 – 10^5 Pa performed using FLASH hydrodynamic codes will be presented. The irradiation of Aluminum target (thickness 2 mm and radius 3 mm) with a 7 ns laser pulse of energy 175 mJ, spot size of 150 m on the target surface at a wavelength of 532 nm at normal incidence is simulated. Helium gas enclosed in a chamber of height 3 mm and width 3 mm. The electron-ion inverse bremsstrahlung absorption coefficient is considered in the laser energy deposition process. The simulation was performed over a duration of 1 μs. It was observed that an ablative shock is launched into the Helium gas for the pressures of 0.5 atm and above. However, for pressure less than the 0.5 atm the plasma expanded into the He gas upto 12ns and after which due to pressure equilibration with the surroundings and plume splitting shock wave is launched in to Al.

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