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Excitation of magnetosonic solitons with high power, pulsed CO₂ laser in an overdense gas-jet target ATUL KUMAR, Institute for Plasma Research, CHANDRASEKHAR SHUKLA, Samspra Aerospace System Pvt., AYUSHI VASHISTHA, Institute for Plasma Research, AMITA DAS, Indian Institute of Technology-Delhi — The recent availability of long wavelength ($10\mu m$), pulsed CO_2 laser has enabled us to use newer targets like gas jet target for overcritical laser plasma interaction. It may simplify high repetition rate operation compared to a solid target since the latter needs to be mechanically replaced or displaced in a very short time. The excitation of magneto-sonic solitons by carrying out the 2D Particle-in-Cell simulation under OSIRIS-4.0 framework in over-dense gas jet targets has been shown with a p-polarised, pulsed CO_2 laser with an intensity $I = 7 \times 10^{17} W/cm^2$, incident normally to the gas jet target in presence of Kilo-Tesla order of an external magnetic field. Furthermore, it has been shown that such an excitation is independent of the polarisation of the CO_2 laser. The solitary structures generated henceforth, are stable for several thousands of plasma periods. The interaction between two magneto-sonic solitons has also been studied by the generation of solitary structures with two CO_2 lasers at both ends of the system.

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