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THz Generation by Two Superposed Short Laser Pulses[1] ANIL KUMAR MALIK, HITENDER KUMAR MALIK, Indian Institute of Technology Delhi 110016 — THz radiation generation is a subject of current interest due to its potential applications in various fields. The use of collective properties of laser-produced plasma underlies a number of methods of THz generation, particularly based on the phenomenon of nonlinear ponderomotive force induced excitation of plasma wake oscillations. A theoretical and simulation study has been done for THz generation based on tunnel - ionization of gas jet when two superposed short pulse lasers (circularly polarized and linearly polarized with same frequency while different amplitudes and phases) are focused on to it. In the proposed scheme a transverse transient current is caused by the presence of residual momentum after passing of the laser pulse. The effect of radial variation of electron density in the plasma channel on the frequency of plasma cylinder oscillation and hence on frequency of emitted THz radiations is examined. With optimum initial phase of the laser envelope and width of the channel, the mechanism seems to be much more efficient than some of other nonlinear phenomenon base mechanisms.

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