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Role of density ripples to resonant Terahertz radiation excitation in laser beating process[1] ANIL K. MALIK, Indian Institute of Technology Delhi, India, SANJAY K. TOMAR, Solid State Physical Laboratory Delhi, India, HITENDRA K. MALIK, Indian Institute of Technology Delhi, India — The Terahertz (THz) radiation has gained much attention of the researchers due to its applications in material characterization, imaging, topography and remote sensing, chemical and security identification, etc. Plasma based THz schemes are attractive because they are capable of producing high power radiation. Several experiments have employed plasma as a medium for the THz radiation generation using sub-picoseconds laser pulses and energetic electron beams. The role of obliqueness of the ripples in plasma density to the THz radiation generation in the process of laser beating is clarified. For this, we use two spatial-super-Gaussian lasers (different indices) having different frequencies and wave numbers but the same field amplitudes. Due to intensity gradient in transverse direction and obliqueness of the density ripples, a transverse component of nonlinear ponderomotive force is realized that produces transverse oscillatory current. This nonlinear current oscillating at beating frequency produces the THz radiation at the beating frequency. We discuss in detail the efficiency of the scheme and power and frequency of the THz radiation with due importance of the density ripples.

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