

SECOND HARMONIC GENERATION OF HIGH POWER COSH-GAUSSIAN BEAM IN THERMAL QUANTUM PLASMA: EFFECT OF RELATIVISTIC AND PONDEROMOTIVE NONLINEARITY[†]

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Second harmonic generation (SHG) of high power Cosh-Gaussian(ChG) beam in thermal quantum plasma (TQP) is explored in current investigation. Relativistic and ponderomotive nonlinearities are taken together in present investigation. Combination of relativistic-ponderomotive nonlinearities causes modification in electron mass, thereby producing density gradients inside plasma. This further produces self-focusing of main beam. The well-known WKB and paraxial approaches are used for solving main beam's wave equation and to obtain 2nd order ordinary differential equation (ODE). There is generation of electron plasma wave (EPW) due to these density gradients. Excited EPW interacts with main beam to generate 2nd harmonics in plasma. Effects of combined relativistic-ponderomotive nonlinearities and established laser - plasma parameters on beam's waist and SHG yield are studied in present study.

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