

INFLUENCE OF SELF-FOCUSED ELLIPTICAL LASER BEAM ON SECOND HARMONIC GENERATION IN COLD QUANTUM PLASMA [†]

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The present work investigates influence of self-focused elliptical laser beam on second harmonic generation (SHG) in cold quantum plasma (CQP). There is establishment of transverse intensity gradients on account of self-focused elliptical laser beam in relativistic plasma. These intensity gradients cause excitation of electron plasma wave (EPW) at pump beam's frequency. Excited EPW interacts nonlinearly with pump wave thereby producing 2nd harmonics. The nonlinear differential equations representing beam waist's behavior against normalized distance is derived through Wentzel, Kramers and Brillouin (WKB), approach and paraxial theory. Non-linear Ordinary differential equation (ODE) is solved numerically in order to explore effect of distinct laser-plasma parameters and quantum contribution on beam waist of pump wave and 2nd harmonics efficiency. The present outcome is compared with classical relativistic plasma (CRP) case.

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