

IMPACT OF HIGH-POWER COSH-GAUSSIAN BEAM ON SECOND HARMONIC GENERATION IN COLLISIONLESS MAGNETOPLASMA[†]

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The impact of high power Cosh-Gaussian (ChG) beam on Second harmonic generation (SHG) in Collisionless magnetoplasma is explored in present work. Whenever the input beam propagates along external magnetic field direction, then there are two propagation modes viz. extraordinary mode and ordinary mode. The modification in magnetic field strength causes redistribution of carriers. The density gradients get established in plasma in a normal direction to input wave due to ponderomotive force. Further, there is production of electron plasma wave (EPW) at input wave frequency due to density gradients. EPW nonlinearly interacts with pump wave causing generation of 2nd harmonics. The 2nd order differential equation (ODE) for beam width and efficiency of 2nd harmonics are derived through well-known paraxial theory approach. RK4 method is employed for carrying out numerical calculation of nonlinear ODE along with efficiency of 2nd harmonics. Impact of change in selective laser-plasma parameters and externally applied magnetic field on beam waist of input wave and efficiency of SHG are also explored.

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