

PROPAGATION CHARACTERISTICS OF Q-GAUSSIAN LASER BEAM IN COLD COLLISIONLESS PLASMA

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The propagation characteristics of q-Gaussian laser beam in Cold Collisionless plasma are explored in current research work. In Cold Collisionless plasma, the carriers get redistributed away from axial portion due to ponderomotive force. This carrier redistribution leads to production of density gradients thereby causing self-focusing of beam. The Wentzel-Kramers-Brillouin and paraxial approximations are utilized for deriving nonlinear 2nd order differential equation for beam width of the beam. Since, this differential equation can't be solved analytically. So, numerical solution has been obtained for exploring the variation of beam width of beam against normalized propagation distance. Impact of variation in established parameters of laser and plasma such as beam intensity, beam radius, density of plasma electrons, plasma temperature and q-parameter on behavior of laser beam is also examined.

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