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Nonlinear Interaction of Bessel Gauss Laser Beams with Plasmas with Axial Temperature Ramp

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Theoretical investigation on nonlinear interaction of intense Bessel-Gauss laser beams with plasma with axial temperature ramp has been presented. Emphasis is put on investigation of self action effects of the laser beam like self focusing, self channelling and axial phase shift of the laser beam. Optical nonlinearity of the plasma has been modelled by the ponderomotive force acting on the plasma electrons due to the intensity gradient over the cross section of the laser beam. Using variational theory based on Lagrangian formulation nonlinear partial differential equation (P.D.E) governing the evolution of beam envelope has been reduced to a ordinary differential equations for the beam width of the laser beam along the transverse directions. The evolution equation for the axial phase of the laser beam has been obtained by the Fourier transform of the amplitude structure
of the laser beam from coordinate space to (kx; ky) space. The differential equations so obtained have been solved numerically to envision the effect of laser-plasma parameters on the propagation dynamics of the laser beam.

Topics

Session B. Laser physics and modern optoelectronics

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