

Self-Action Effects of a Non-Gaussian Laser Beam Through Plasma

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Abstract : The propagation of the Non-Gaussian laser beam results in strong self-focusing as compare to the Gaussian laser beam, which helps to achieve a prerequisite of the plasma-based electron, Terahertz generation, and higher harmonic generations. The theoretical investigation on the evolution of non-Gaussian laser beam through the collisional plasma with ramped density has been presented. The non-uniform irradiance over the cross-section of the laser beam results in redistribution of the carriers that modifies the optical response of the plasma in such a way that the plasma behaves like a converging lens to the laser beam. The formulation is based on finding a semi-analytical solution of the nonlinear Schrodinger wave equation (NLSE) with the help of variational theory. It has been observed that the decentred parameter 'q' of laser and wavenumber of ripples of medium contribute to providing the required conditions for the improvement of self-focusing.

Keywords : non-Gaussian beam, collisional plasma, variational theory, self-focusing

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