

Ion Acoustic Wave Excitation by Bessel Gauss Laser Beams in Plasmas with Axial Density Ramp: Effect of Self Focusing

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This theoretical study examines the interaction between Bessel-Gauss laser beams and ion acoustic waves (IAWs) in a plasma with a gradually increasing density profile. The focus is on how the laser beams self-focusing affects the power of the generated IAWs. As the laser propagates through the plasma, it excites an IAW at its characteristic frequency. Nonlinear coupling between the IAW and the laser arises due to the ponderomotive force acting on plasma electrons. By employing variational theory and the WKB approximation, we derive semi-analytical solutions for the coupled nonlinear wave equations. Our results demonstrate that the self-focusing of the laser beam plays a crucial role in determining the power of the excited IAW.

Type of presence

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