

White light generation under laser driven avalanche breakdown of air

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Abstract

A theoretical model of avalanche breakdown of air by a Gaussian laser beam and white light generation is developed. An intense laser beam, below the threshold for tunnel ionization heats the seed electrons to high energy that causes avalanche ionization of the air. However, the plasma density has a maximum on axis and falls off with radial coordinates. Such a density profile causes refraction divergence of the beam. However, temporal evolution of plasma density causes self phase modulation of the laser pulse causing frequency broadening of the pulse. The hot plasma thus produced causes strong spectral emission in the visible.

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