Numerical study of nonlinear oscillations and pattern formation in glow discharge- semiconductor system

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We studied a system consisted of a planar glow discharge layer with short length in the forward direction and wide lateral dimensions, which is coupled to a semiconductor layer with low conductivity. The whole structure is sandwiched between two planar electrodes, to which a dc voltage is applied. Experiments show that such a system can create different homogeneous stationary and homogeneous oscillating modes, patterns with spatial and spatiotemporal structures. We developed and applied full three-dimensional fluid numerical code to study temporal and spatial pattern formation in this system.