

First-Order-Like Phase Transition Induced by Two Different Kinds of Noise in Dispersive Optical Bistability

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Abstract: With unified colored noise approximation, the steady state distribution function in dispersive optical bistability including both intensity and phase fluctuations is obtained. The parameter plane of the first-order-like phase transition is also derived with numerical method. It is found that the number of extremes at non-zero values of the output field in the steady state distribution function is changed from zero, two to four. It is shown that the strengths of the intensity fluctuation and the phase fluctuation have great effect on the first-order-like phase transition.

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Key words: dispersive optical bistability, first-order-like phase transition, intensity fluctuation, phase fluctuation, colored noise, white noise

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