Effect on Intensity Correlation Time by Input Signal in a Single-Mode Laser with Bias Signal Modulation

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Abstract: The effect on intensity correlation time T by input signal is studied for gain-noise model of a single-mode laser driven by colored pump noise and colored quantum noise with colored cross-correlation with a bias signal modulation in this paper. By using the linear approximation method, we detect that there exists maximum (i.e., resonance) in the curve of the intensity correlation time T upon bias current i_0 when the noise correlation coefficient λ is positive; and there exists minimum (i.e., suppression) in the T-i_0 curve when λ is negative. And when λ is zero, T increases monotonously with increasing i_0. Furthermore, the curve of T upon the signal frequency Ω is also studied. Our study shows that no matter what the value of λ is, there exists minimum (i.e., suppression) in the T-Ω curve.

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