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# Dynamics of Two-Photon Lasers with Λ Atomic Level Configuration

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Abstract: We derive the dimensionless dynamic equations of two-photon lasers with Λ atomic level configuration by using the quantum Langevin equation method with the considerations of atomic coherence and injected classical fields. Then we analyze the stability and the chaotic dynamics of the two-photon laser by calculating the bifurcation diagram and the maximum Lyapunov exponent (MLE). Our results show that the Lorenz strange attractors and one-focus strange attractors can exist in this system, and the chaos can be induced or inhibited by the injected classical fields via Hopf-bifurcations or crises, while the atomic coherence induces chaos via crises, and inhibit chaos via Hopf bifurcation or crises.

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