Experimental study of the dynamics of a periodically forced semiconductor laser with optical feedback

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We study experimentally the spiking output of a semiconductor laser induced by time-delayed optical feedback. We analyze the role of external periodic forcing (implemented via direct pump current modulation) in the statistical properties of the inter-spike-intervals (ISIs). By using a symbolic method of analysis (ordinal analysis [1]) we identify subtle changes in the sequence of optical spikes, revealed by variations in the probabilities of the ordinal patterns and the transition probabilities. We show that the ordinal probabilities allow to clearly identify the parameter regions of noisy locking [2, 3].

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