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Dynamic behavior of inter-puls time intervals of neuron-like pulses in a GaAs/InGaAs multi-quantum well structure.¹ ARUNA WEERASEKARA, STEVEN MATSIK, GENNADY CYMBALYUK, A. G. UNIL PERERA, Georgia State University — Neuron-like triggered pulses in a GaAs/InGaAs multi-quantum well (MQW) structure, which shows an s-type negative differential resistance (SNDR), was investigated. Dynamic behavior of inter-pulse time intervals (IPTIs) was studied by analyzing first return maps, power spectra, and correlation dimension. First return maps of the IPTIs show an interesting grouping pattern at slower pulse rates. The grouping behavior can be empirically modeled using oscillatory behavior of the pulsing threshold level of the MQW structure. This pattern of IPTIs is similar to that of thermoreceptors in fish and mammals. Under different operational conditions, correlation dimension of 8.0, 8.5, and 10.0 were obtained by calculating the correlation integrals. The obtained correlation dimensions suggest that this system possesses a higher dimensional behavior.

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