

**Bistable regimes in quantum-dot mode-locked laser with optical injection**

T. Habruseva, S. Hegarty, A. Vladimirov, A. Pimenov, D. Rachinskii,  
E. Viktorov, G. Huyet

*Centre for Advanced Photonics & Process Analysis, Cork Insitute of Technology, Cork,  
Ireland, e-mail: [tatiana.gabruseva@gmail.com](mailto:tatiana.gabruseva@gmail.com)*

We study experimentally the dynamics of quantum-dot passively mode-locked semiconductor laser under external optical injection. We show that the domains corresponding to different laser operation regimes have different boundaries depending on the sign of the master-slave detuning. The laser, therefore, demonstrates multiple bistabilities and hysteresis in the laser output parameters. The area of hysteresis loop grows with optical injection powers and disappears at sufficiently high injection levels.

**Multistability and the transformation of tori in driven Ikeda map with weak dissipation**

A.P. Kuznetsov, E.Yu. Latuhina, A.V. Savin

*Department of Nonlinear Processes, Saratov State University, Saratov, Russia,  
e-mail: [avsavin@rambler.ru](mailto:avsavin@rambler.ru)*

It is rather well known that a lot of attractors coexist in dynamical systems with weak dissipation. It seems to be interesting to consider the system with weak dissipation driven by signal which frequency is incommensurable with the eigenfrequency of the system. It is obvious that periodic attractors transform to quasiperiodical attractors, or tori, due to that influence. But one can expect some nontrivial effects, e.g. nonlocal bifurcations, in the case of a large number of coexisting attractors, for example, due to the increase of the attractor size. We consider the Ikeda map which is one of the classic models of nonlinear dynamics, driven by external signal and investigate the coexisting tori and their evolution in the case of weak dissipation.

**Unidirectionally coupled generators of the hyperbolic chaos:  
phenomenon of generalized synchronization and  
based on it methods of the secure communication**

O. Isaeva

*Institute of Radio-Engineering and Electronics of RAS, Saratov State University,  
Saratov, Russia, e-mail: [IsaevaO@rambler.ru](mailto:IsaevaO@rambler.ru)*

In 2005 by S.P. Kuznetsov the first example of physically realizable system with robust hyperbolic chaotic dynamics associated with Smale-Williams attractor was suggested [Phys. Rev Lett., 95, 144101]. In present work the direction of technical application of the generators of robust chaos is developed. These