

Eugene Wigner Colloquium

event of SFB 910



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“Dissipative solitons for delayed-feedback systems”

We demonstrate how nonlinear delayed-feedback in the Ikeda equation can induce isolated pulses, called dissipative solitons. The solitons are clearly identified in the virtual space-time representation of the equations subject to bi-stability of the feedback function. The phenomenon is revealed for a nonlinear photonic system with two highly asymmetric delays [1], and for an electronic experiment with only one delay but negative feedback [2]. Along with the existence and stability of single soliton, a variety of compound soliton-based structures is obtained. The number of the coexisting multi-soliton states is fast growing with delay opening new perspectives in the context of information storage.

- [1] D. Brunner, B. Penkovsky, R. Levchenko, E. Schöll, L. Larger, and Yu. Maistrenko. Two-dimensional spatiotemporal complexity in dual-delayed nonlinear feedback systems: Chimeras and dissipative solitons. *Chaos* **28**, 103106 (2018)
- [2] V. Semenov and Yu. Maistrenko. Dissipative solitons for bistable delayed-feedback systems. *Chaos* **28**, 101103 (2018)

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