Halbleiter-Nanophotonik

SFB 787

Einladung

Es spricht: **Haroon Asghar**
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Zeit: **Mittwoch, 26. Oktober 2016, 14:00 Uhr**

Ort: **Technische Universität Berlin**
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Thema: **„Optimum stabilization of passively mode-locked quantum dash lasers emitting at ≈ 1.55 µm and operating at ≈ 21 GHz repetition rate via single and dual optical feedback"**

Abstract:

Quantum confined, passively mode-locked diode lasers (MLLs) have attracted much attention in recent years due to increasing interest in highly stable ultrafast pulse trains for diverse applications in optical communication, sampling, comb generation, clock recovery, remote sensing and ranging, and optical clock distribution. Particularly, picosecond pulse duration from these MLLs has been demonstrated routinely, these pulses have significant chirp and poor timing jitter which limits their practical applications.

In this work, we have experimentally investigated the timing stability of a passively mode-locked two-section quantum dash lasers emitting at ≈ 1.55 µm and operating at ≈ 21 GHz repetition rate subjected to dual optical feedback. The feedback level yields narrowest linewidth and reduced timing jitter is clearly well identified for single and dual loop configurations. This study reveals that dual loop feedback with fine tuning of shorter feedback cavity to fully resonant condition and optimization of full delay phase of longer feedback cavity leads long-time scale jitter stabilization as compared to single optical feedback. Furthermore, based on experimental measurements, the RF linewidth and timing jitter on full-delay range reduces up to a factor of 100 and 10, respectively, with respect to free running condition. It is further confirmed that experimentally measured integrated timing jitter is proportional to square root of 3-dB RF linewidth, which agrees well with previously published numerical expression. Our findings suggest that dual feedback technique is superior to single loop feedback due to separate fine tuning of both external cavities: causes long-time scale jitter stabilization, making it a robust and effective technique for developing practical, reliable and low noise mode-locked diode lasers and optoelectronic oscillators.

Gäste sind herzlich willkommen!
Prof. Dr. K. Lüdge