Diploma thesis abstract

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Influence of electrooptic negative feedback on timing stabilization of pulses in laser with active mode locking

Timing evolution of pulse relative to active mode locking (AML) signal in picosecond pulse-periodic laser with AML and optoelectronic negative feedback is studied.

It is shown that behavior of optical pulse relative to AML signal in stable generation region is sufficiently depends on AML frequency detuning: while forming, pulse can obtain 1ns delay and even more. Then a new pulse arises in region with lower AML-related losses while old pulse degenerates. It is noted that borders of stable generation region are asymmetric relative to AML frequency with constant pulse delay. Velocity of delay increasing is different for positive and negative AML frequency detuning. The replacement process is qualitative different for positive and negative AML frequency detuning too, moreover positive detuning leads to hard-to-detect scenario when using common equipment.

A hardware-software system was created for quick analysis of generation dynamics and proper tuning of AML frequency. Standard technique for such tuning (using mean AML frequency of stable generation region) is corrected.

A numeric model for studying such asymmetries in lasers with AML and NFB was created showing qualitative compliance with experiments.

mentor

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