

Annotation

Theme of the master's thesis: «High peak power picosecond lasers generation control»

The volume of the master's thesis is 42 pages, on which 23 figures and 1 table are placed. When writing the master's thesis, 40 sources were used.

Key words: picosecond laser pulses, laser control systems, FPGA.

The object of the study was the process of pulse formation in picosecond lasers of high peak power.

The subject of the study was the features of the organization of control in picosecond lasers of high peak power.

The work includes an introduction, two chapters, conclusions and summary.

In the introduction, the relevance of the topic is substantiated, scientific, practical significance. The tasks necessary to achieve the research goal are set. The problems are described and the structure of the work is described.

In the first chapter of the master's thesis methods of obtaining picosecond laser pulses are considered. Various approaches to obtaining picosecond laser pulses are analyzed. The experimental results for the scheme with obtaining a pulse on the initial active medium are discussed with their discussion. For the scheme with amplification of the pulse from the laser diode, the results of numerical simulation are given, and the main parameters are estimated. The chapter ends with a comparative analysis of different approaches to generate the pulses.

In the second chapter, an approach to controlling the generation of ultrashort pulses is considered. The main requirements for such a system are given, various approaches to building a management system are considered. Descriptions of blocks and algorithms of the control system are given. At the end of the chapter, an analysis is made of the use of FPGA resources by the proposed scheme.

The conclusions describes possible ways of constructing a picosecond pulse generator circuit and potential problems. The conclusion is made about the advantages of a combined FPGA circuit and a microcontroller for laser control.

The summary contains the main conclusions and proposals for the construction of picosecond lasers of high peak power and control systems for them.