

## Review

by **Prof. Dr. Chong-Geng Ma**, Deputy Director of Office of International Cooperation and Exchanges & Full Professor in School of Optoelectronic Engineering Chongqing University of Posts and Telecommunications,

on the abstract of the dissertation of **Murodi Halimjon Ghafurzoda**, titled "*Physical Fundamentals of Time Characteristics Control in Continuously Operating Lasers with a Saturable Absorber Inside a Resonator*," submitted for the degree of **Doctor of Physical and Mathematical Sciences** in the specialty **01.04.07 - Condensed Matter Physics**.

The study of mode synchronization is of significant practical importance, and the discovery of new aspects-such as the effect of differences in saturation conditions-provides a foundation for establishing criteria to select the optimal operating mode for both individual elements and the laser system as a whole. Since saturation condition variations primarily depend on factors such as resonator geometry and the optical properties of the absorber, the author effectively justifies the relevance of the dissertation topic. There are no fundamental objections to the formulation of the research purpose and objectives, the object and subject of study, or the theoretical foundation of the work.

The scientific novelty of H. G. Murodi's dissertation research lies in establishing a criterion for selecting a saturable absorber, demonstrating the feasibility of simultaneous synchronization of multiple groups of longitudinal modes, and exploring the use of light pulses as information carriers. Additionally, the study investigates the potential application of multiple closely spaced pulses in the ablation process.

Based on the content of the abstract, the following positive aspects of the dissertation research can be highlighted:

-The identified parameter that determines the difference in saturation conditions serves as a criterion for selecting the most effective operating mode of the saturable absorber.

-The use of multiple closely spaced pulses enables precise and smooth control over the boundaries of the ablation process.

However, the study also has some limitations:

-The first threshold condition should account for the excess of gain over absorption and linear losses.

-The abstract does not specify the unit of measurement for unsaturated absorption.

These shortcomings are purely advisory in nature and do not diminish the significance or merits of the completed dissertation research.

Based on the results of the study, the author has published a total of 37 scientific papers, including one monograph and 19 research articles in peer-reviewed journals recognized by the Higher Attestation Commission of the Ministry of Education and Science of the Russian Federation.

Overall, Murodi Halimjon Ghafurzoda has conducted significant and highly relevant scientific research and unquestionably deserves to be awarded the academic degree of Doctor of Physical and Mathematical Sciences in the specialty 01.04.07 - Condensed Matter Physics.

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This certifies that the above signature belongs to Prof. Dr. Chong-Geng Ma

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