



**Assessment of the dissertation of Jakub Novák, Eng.**  
**“Diode pumped thin disk lasers for high repetition rate  
picosecond OPCPA pumping”**

**Introductory part:** submitted dissertation is the result of author's doctoral study at the Department of Physical Electronics, FNSPE, Czech Technical University in Prague during years 2010 – 2016. The submitted thesis is devoted to the development of thin disk pump lasers for a high power and high repetition rate optical parametric chirped-pulse amplification (OPCPA). All experimental parts of work were performed at ELI laboratories in Prague.

Jakub Novák started PhD. studies after finishing Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering where he worked three years in the laser laboratory. So he had from the beginning of PhD. studies very good theoretical and experimental background knowledge for his future work. He has been very early oriented in the required project and he mastered both the theoretical training and specialized courses. In his work the fundamental contribution had also in summary 9 months study visit at the Max Planck Institute for Quantum Optics in Garching Germany and also 7 months practical training at Lawrence Livermore National Laboratory, USA.

**PhD thesis:** the work contains 5 chapters and it has 118 pages. The text is substantiated by 63 figures and 4 tables. In the introduction part of the thesis the author describes the motivation and state of the art of the work. He explains the goal of the European project Extreme Light Infrastructure, and discusses the basic techniques of broadband amplification and available pump lasers with emphasis on thin disk laser-pumped OPCPA. This overview also clarifies the choice of technology for the L1 laser system at ELI Beamlines which is his interest in this thesis. The aims of the dissertation are described in Chapter 2. The third chapter extensively describes all ingredients, methods, and technology necessary for the successful completion of the required goals. The fourth chapter is divided into four sections,

each describing one developed regenerative amplifier, its properties, and results. It is the 10 mJ regenerative amplifier as the first prototype, the upgraded version - the CVBG regenerative amplifier, reaches higher energy with the help of a chirped volume Bragg grating, and the final upgrade of this system - the 30 mJ regenerative amplifier, and in the end, the main achievement of this work, the development and experimental results of the 100 mJ regenerative amplifier. The fifth chapter concludes the whole work and points out its contribution to the research community and science. All results presented in this work have been published in reputable journals or presented at international conferences.

**Thesis evaluative part:** the thesis is written very clearly, technically precisely, the facts are arranged logically and the explanations of the used methods are complete. In the text there are clear goals that the author had in mind and that were achieved. The work includes the extensive documentation related to the solved subject. The whole work forms a distinct contribution to the knowledge in the area of thin disk pump lasers for the exceptional optical parametric chirped-pulse amplification. In the thesis the new substantial facts are presented. The literary presentation is on the highest level.

**Evaluation of the author:** It is possible to conclude that Jakub Novák has been working very hard during the above mentioned years, fulfilled all needed requirements and he obtained the excellent results. It can be noted that Jakub Novák is a very talented young scientist with the broad experimental experiences. His dissertation is in accordance with § 47 section 4 of the law No.111 / 98 Coll.

Based on the facts and opinions stated above, I recommend Jakub Novák's dissertation "*Diode pumped thin disk lasers for high repetition rate picosecond OPCA pumping*" to be accepted for defence and in the case of success I recommend to award him

the Doctor of Philosophy degree in Applied Natural Sciences

Prague November 25<sup>th</sup>, 2016

PROF. HELENA JEJINKOVA, DRSC.  
Supervisor