## EQUIPMENT AND COMPONENTS USED IN THE FIELD OF REGISTRATION OF FAST PROCESSES

E. B. Serdyuk<sup>1</sup>, A. N. Abdrshin<sup>2</sup>

<sup>1</sup>LLC "Nordlaze", St. Petersburg, Russia

<sup>2</sup>JSC "LLS", St. Petersburg, Russia

E-mail: e.serdyuk@lenalsers.ru

The report deals with complexes for registration of fast processes as a set of solutions consisting of many technical and technological aspects. At the moment Russia does not produce the whole set of technical means for creation of such complexes, and therefore the question of import of sensitive equipment and components for creation of necessary solutions remains urgent.

The report reviews the available solutions for the Russian market under the sanctions pressure of unfriendly countries aimed at reducing the industrial and scientific potential of the Russian Federation.

Creation of each complex starts with laboratory arrangement, and therefore the first point is to consider approaches to complex equipment of laboratories for production and testing of laser sources and systems: optomechanics, vibration isolation and cleanliness maintenance systems, measuring equipment. Equipment for spectral data analysis: optical sensors, hyperspectral cameras, Raman spectroscopy. The experience of supply and commissioning of unique equipment is considered.

Laser sources are an important part of the systems. Different types of laser technologies, such as fiber lasers, semiconductor lasers, solid-state lasers, as well as combinations of these technologies are considered. In addition, various options for obtaining specific wavelengths using parametric generation (including harmonic generation, difference frequency generation and others) are considered. The review includes Russian-made solutions available on the market, including existing developments in this area from Nordlaze LLC.

Particular attention is paid to components, since it is in the case of components that reliable serial deliveries are required. Fiber components and pump diodes for realization of high-power laser systems are considered, as well as components for assembly of solid-state lasers: optics, laser and nonlinear crystals.

However, recently the possibility to produce components on the territory of the Russian Federation is of particular importance, especially within the framework of the import substitution program aimed at ensuring the technological sovereignty of the Russian Federation. In this connection the equipment for production of various components is considered.

The first group of such equipment considers actual solutions in the field of semiconductor structures and sources: here we reviewed available solutions for lithography, laser microprocessing stations, semiconductor structure growth units, vacuum equipment.

Specialized equipment for working with optical fibers and production of fiber-optic components is also reviewed. Experience with welding machines for special-purpose fibers, coating restorers, splicers and interferometers for chipping inspection of Chinese production is considered. The nomenclature of complexes for production is shown: tepper stations for optical fibers, designed for development and production of (2+1)\*1 optical fiber combiners, WDM, teepers, splitters, and three-electrode optical fiber processing system, designed for development and production of high power pump fiber combiners, signal combiners and endcaps. The equipment also enables the production of fiber collimators, which are used in large quantities in complexes for recording fast processes.