Toshiba). The planning for radiation treatment was carried out for photons and high-energy (15 MeV) electrons beams with different geometry:

- "box" - 4 beam (60 Gy / 2 Gy);
- field produced by a multi - petal collimator;
- 5 fields without filters;
- 5 fields with filters;
- "box" - 4 beam (60 Gy / 3 Gy).

Evaluation of the most appropriate radiation dose distribution was carried out on the basis of DVH - histograms.

The present study demonstrates the relationship between the dose distributions and the selected treatment plan. As a result of research, the comparison and analysis of algorithms for dose calculation in tissue-equivalent environment using treatment planning system PLUNC has been conducted. A methodological guide for working with the use of the PLUNC software has been developed.

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APPLICATION OF RADIOMETRIC METHODS FOR MINERALS STUDY

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Radiometry is a set of methods used for measuring ionizing activity of radiation sources. Determination and study of natural minerals and rocks radioactivity is the basis for applying radiometric methods in mining industry. They are widely used in all research, exploration and exploitation stages of mineral products to determine the natural radionuclides in the subsurface rock, ores and processed products. Also, total radioactivity in samples is determined by measuring alpha, beta and gamma radiation, or main radioactive elements are determined separately using combined radiation.

According to the type of radiation, radiometric methods are divided into α-, β-, γ-methods:

1. Alpha radiation is a stream of positively charged particles (nucleus of helium). α-method is used to measure alpha-radiation and determine the concentration of radioactive elements (U, 222Rn, 226Ra, etc.) in radioactive ores and rocks. Application of this method is a complicated task due to special features of alpha-particles.

2. Beta radiation is a flow of electrons (β^-- radiation, or, more often, simply β-radiation) or positrons (β + - radiation), which is caused by radioactive decay.

3. Gamma radiation is a stream of electromagnetic radiation of very high frequency. Although the particles are scattered and absorbed by the environment, they have a higher penetration power owing to its electrical neutrality.

Some minerals are radioactive. The examples of radioactive ores are as follows: natural uranium, cinnabar, thorium and others. Therefore, rocks radioactivity can be determined by the rock-forming mineral radioactivity and varies within very wide limits depending on the quality and quantity of minerals, formation conditions, age and

metamorphism intensity. The concentration of radioactive elements in igneous rocks increases from ultramafic to acid rocks. It can be determined using radiometric methods.

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RESEARCH OF THE CONDENSED BEAM STOP DYNAMICS UNDER LOADING WITH A HIGH-POWER ION BEAM OF POWER DENSITY ≥ 10^{10} W/CM2

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Active research in physics of shock waves resulted in the development of a wide range of ways of excitement and registration of shock load pulses in condensed media. High-energy concentration, which is achieved by the corpuscular and laser beams exposure of sub-microsecond duration at the condensed beam stop, determines their increasingly wide use both for scientific investigations and when solving different practical tasks.

The processes of intense evaporation, vapour ionization and gas-flame plume formation take on a vital part on exposures at a condensed medium with power density of the thermonuclear range [1]. There is a number of works dedicated to investigation of shock wave and plasma processes under high-power loading [2–4].

The generalized physical-mathematical model, describing the behavior of the metallic beam stop under the external high-power energy exposure, was formulated in course of the research conducted. The characteristics of the aluminum target under the ion beam exposure of power density ≈10^{10}W/cm^2 were examined.

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CHERENKOV RADIATION AND ITS APPLICATION FOR DIAGNOSTICS OF CHARGED PARTICLE BEAMS

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In this work the application feasibility for diagnostics of electron beam transverse profile using Cherenkov radiation is demonstrated. Electron beam was generated in optical fibers of 0.6 mm thick. The comparison of curves obtained from optical fibers and Gafchromic EBT – 3 X-ray films [1] has been made. The experimental results have been also compared with the model in PCLab program [2]. Using this method of measuring electron beam transverse