

# Experimental determination of the titan alloy laser ablation threshold energy density

Mkrtychev O.V.<sup>1,®</sup>, Shemanin V.G.<sup>1</sup> and Urasov K.V.<sup>1</sup>

<sup>1</sup> Novorossiysk Polytechnic Institute of the Kuban State Technical University, Karl Marx 20, Novorossiysk, 353900, Russia

® oleg214@ya.ru

The threshold values of the energy density of titanium alloy samples were measured at the Laser ablation station from [1–4] at given incident laser pulse energy values and focusing conditions (dimensional effect) during the destruction of titanium alloy samples. YAG:Nd laser radiation with pulses of 1.6 ms duration and energies up to 1.2 J at the 1064 nm wavelength was used, which was focused with a lens on the titanium alloy sample surface. These experimentally measured threshold values of energy density at probability 0 will be threshold values  $F_t = 5.1 \text{ kJ/cm}^2$  according to GOST [5], and at probability 0.5 –  $F_{0.5} = 57.8 \text{ kJ/cm}^2$  can be used to construct reliability dynamics curves as before in [1, 2]. The probability the value of 1 at a threshold the energy density value  $F = 93.5$  and remains so until a maximum value of  $170 \text{ kJ/cm}^2$ . These data are physical constants for samples of such a titanium alloy and are in satisfactory agreement with the data [6].

- [1] Atkarskaya A B, Mkrtychev O V, Privalov V E and Shemanin V G 2014 *Optical Memory and Neural Networks (Information Optics)* **23**(4) 265–270
- [2] Privalov V E, Shemanin V G and Mkrtychev O V 2018 *Measurement Techniques* **61**(7) 694–698
- [3] Voronina E I, Efremov V P, Privalov V E and Shemanin V G 2003 *Proceedings SPIE* 5381
- [4] Voronina E I, Chartiy P V and Shemanin V G 2005 *Extremal States Physics* 36–37
- [5] 58369-2019 G R 2019 *Lasers and laser equipment. Methods of the laser destruction threshold determination* (Moscow: Law Standart)
- [6] Zheng B, Jiang G, Wang W, Wang K and Mei X 2014 *AIP Advances* **4**(3)