MEASUREMENTS OF CONTINUOUS OPTICAL SPECTRUM DURING NANOSECOND LASER PULSE INTERACTION WITH METALLIC TARGET

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Abstract. Relying on classical time-resolved optical emission spectroscopy, experimental study of the evolution of the plasma plume created in nanosecond laser ablation of a copper sample at reduced atmospheric pressure (5 Pa) is done. The laser pulses of 5.6 ns duration had the carrier wavelength of 1064 nm and the intensity in the range from 10^9 W/cm^2 to 10^{12} W/cm^2. The measurement data were collected in the spectral range from 200 nm to 850 nm with temporal resolution of 1 ns. The spectral emission was observed simultaneously looking directly at the illuminated spot on the copper surface, and side-on, along the sample surface. The temperature of the copper surface and the plasma was deduced by fitting the emission spectrum to the theoretical Plancks law. Temperatures of the copper surface are in the 7 400-11 200 K range. These values are close to the most common estimated values for the critical temperature of the copper. After the plasma creation, it was found that its temperature overcome 50 000 K.

References

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