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Two-color pyrometry methods for measuring the surface temperature of materials exposed to a plasma jet

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The choice of a radiation high-speed non-contact method for measuring the surface temperature of an object under the influence of a hydrogen plasma jet is substantiated.
A theoretical assessment was made of the contribution of the intensity of recombination and bremsstrahlung plasma radiation to the pyrometer readings. It is shown that under certain conditions hydrogen plasma can be considered transparent to the thermal radiation of the material in the mid-IR wavelength (MWIR) range of 3–5 μm.
An infrared spectral ratio pyrometer based on an uncooled two-spectral MWIR photodiode sandwich structure designed to control the temperature of an object under study in an experimental setup of a hydrogen plasma gun is considered. The experimental results of monitoring the surface temperature of some composite materials samples in the process of pulsed plasma exposure are presented.

Keywords: spectral ratio pyrometer, two-spectral MWIR photodiode sandwich, composite materials, hydrogen plasma, plasma-wall interaction

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