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ABSTRACT

This paper reports the experimental results of a high-speed multi-frame infrared camera which has been developed in Sarov at VNIIEF. Earlier [1] we discussed the possibility of creation of the multi-frame infrared radiation photo-recorder with framing frequency about 1 MHz. The basis of the photo-recorder is a semiconductor ionization camera [2, 3], which converts IR radiation of spectral range 1-10 micrometers into a visible image. Several sequential thermal images are registered by using the IR converter in conjunction with a multi-frame electron-optical camera. In the present report we discuss the performance characteristics of a prototype commercial 9-frame high-speed IR photo-recorder. The image converter records infrared images of thermal fields corresponding to temperatures ranging from 300°C to 2000°C with an exposure time of 1-20 μs at a frame frequency up to 500 KHz. The IR-photo-recorder camera is useful for recording the time evolution of thermal fields in fast processes such as gas dynamics, ballistics, pulsed welding, thermal processing, automotive industry, aircraft construction, in pulsed-power electric experiments, and for the measurement of spatial mode characteristics of IR-laser radiation.

Key words: high-speed frame photography, IR-radiation, thermal field imaging.

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