Fiber tip temperature controlling system for fiber output laser modules in medical equipment

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Abstract

An-optical- fibre- tip temperature control device embedded into the power supply unit of high power laser diodes and modules (with fiber-optic output) used in medical laser equipment is proposed. As the sensing element, a III–V mid-infrared photodiode develop ed at the Ioffe Physical-Technical Institute is chosen from the photodiode class whose parameters are optimal for developing multipurpose thermal radiation detectors (pyrometric sensors). The developed device allows temperature control at the working tip of the optical fiber of the laser "scalpel" in the range of 600–1100°C with an error no worse than 1% for a response time of 1 ms. The device has digital and analog temperature-signal outputs, which can be used to control the laser pump current, thus extending the functionality of medical laser equipment, increasing its efficiency, safety, and service life

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