**High-power laser beam profile measurements based on the matrix array of the copper-coated passive optical fibers**

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**Abstract:**

Nowadays, the optical power of industrial CW fiber lasers exceeds 10 kW level. In many practical laser applications it is necessary to know its beam quality and, therefore, transverse optical intensity profile. In this paper, we introduce a novel approach for the measurement of the intensity profile of high-power laser radiation, which does not require any preliminary attenuation. It is based on the application of the array made of multimode passive optical fibers coated with external copper layer. The investigated laser radiation was directed into the polished end faces of the matrix fiber elements. Laser radiation, scattered in each fiber, was completely absorbed inside its’ copper coating leading to its heating and, therefore, to its proportional electrical resistance change. The intensity profile of the incident beam was evaluated by measuring the copper coatings resistance change of each fiber. Intensity profiles of the single-mode and multimode fiber laser beams were successfully measured using proposed fiber array sensor. The introduced technique can be applied for the determination of the beam quality factors (M2).