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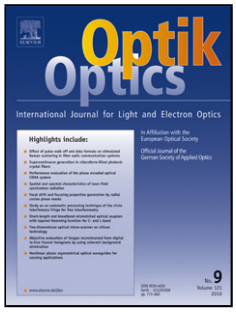

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Comparative study of surface and body absorptions for axisymmetric modeling of long pulsed laser heating material: theoretical model and mathematical solutions of temperature

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Abstract:

In this paper, we presented the comparative study of surface and body absorptions for axisymmetric modeling of long pulsed laser heating material. Firstly, theoretical models of surface absorption is established based on the representation of heat source term through the surface boundary of material, and mathematical solutions of its homogeneous equation are obtained using separation of variables and Laplace transform method. Next, theoretical models of body absorption is established based on the representation of heat source term in the heat conduction equation, and mathematical solutions of its non-homogeneous equation are obtained using integral transform method. The presented methods are validated through modeling results of the surface absorption and body absorption model respectively.

Keywords: laser heating; surface absorption; body absorption; theoretical model; mathematical solutions

1 Introduction

Modeling of laser heating material is very important for the applications of laser

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