# Heat accumulation during pulsed laser materials processing: erratum

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**Abstract:** With this erratum we aim to correct a transcription error that occurred in our previous paper: In Eq. (3)a)-(3c), Eq. (5), and Eq. (6) the Greek characters were not converted correctly. The properly formatted formulae are listed below. All other contents, calculations and conclusions of the original paper remain unchanged.



**OCIS codes:** (140.3390) Laser materials processing; (140.6810) Thermal effects.

## References and Links

1. R. Weber, T. Graf, P. Berger, V. Onuseit, M. Wiedenmann, C. Freitag, and A. Feuer, "Heat accumulation during pulsed laser materials processing," Opt. Express **22**(9), 11312–11324 (2014).

## Corrected formula

In the formulae (3a)-(3c) in [1], the roman characters *r* (just the first letter in the denominator), *p,* and *k* must be replaced by the Greek characters $\rho$, $\pi$, and $\kappa$, respectively. The formulae correctly read:

$$T_{1D} - T_0 = \Delta T_{1D} = \frac{Q_{1D}}{\rho \cdot c_p \cdot \sqrt{4 \cdot \pi \cdot \kappa \cdot t}} e^{-\frac{r^2}{4 \cdot \kappa \cdot t}} \qquad \left(r^2 = z^2\right) \qquad \textbf{1D} \tag{3a}$$

$$T_{2D} - T_0 = \Delta T_{2D} = \frac{Q_{2D}}{\rho \cdot c_p \cdot \sqrt{\left(4 \cdot \pi \cdot \kappa \cdot t\right)^2}} e^{-\frac{r^2}{4 \cdot \kappa \cdot t}} \qquad \left(r^2 = x^2 + y^2\right) \qquad \textbf{2D} \tag{3b}$$

$$T_{3D} - T_0 = \Delta T_{3D} = \frac{Q_{3D}}{\rho \cdot c_p \cdot \sqrt{\left(4 \cdot \pi \cdot \kappa \cdot t\right)^3}} e^{-\frac{r^2}{4 \cdot \kappa \cdot t}} \qquad \left(r^2 = x^2 + y^2 + z^2\right) \qquad \textbf{3D} \tag{3c}$$

where $\Delta T_{nD}$ is the temperature increase with respect to the initial temperature $T_0$, $nD \in [1,2,3]$, $\rho$ is the mass density of the solid or liquid material, $c_p$ its specific heat capacity, $\kappa = \lambda_{th} / (\rho\, c_p)$ the temperature conductivity, $\lambda_{th}$ the heat conductivity, $t$ is time, and $x,y,z$ are the spatial coordinates.

The same corrections apply to Eq. (5)

$$T_{nD} - T_0 = \Delta T_{nD} = \frac{Q_{nD}}{\rho \cdot c_p \cdot \sqrt{\left(4 \cdot \pi \cdot \kappa \cdot t\right)^{nD}}} e^{-\frac{1}{t} \frac{r_{nD}^2}{4 \cdot \kappa}} \qquad \textbf{nDim} \tag{5}$$

and Eq. (6)

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$$\Delta T_{nD}\left(t,N\right)=\frac{Q_{nD}\cdot\Theta\left(t-\frac{N-1}{f_L}\right)}{\rho\cdot c_p\cdot\sqrt{\left(4\cdot\pi\cdot\kappa\cdot\left(t-\frac{N-1}{f_L}\right)\right)^{nD}}}e^{-\frac{1}{\left(t-\frac{N-1}{f_L}\right)}\cdot\frac{r_{nD}^2}{4\cdot\kappa}} \quad (6)$$

The Heaviside function Θ is equal to zero for arguments <0 and equal to one for arguments ≥0.

All other contents, calculations and conclusions of the original paper are correct and remain unchanged. The description of the variables was not changed and is kept in the text for easier reading of the formulae.

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