ABOUT THE DETERMINATION OF THE PHOTON POWER

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Owing to the pioneer work of Einstein and Planck at the beginning of the 20th century, we are able to calculate the energy of the one photon today. With rapid growing meaning of the nanotechnologies and the development of the processes, which are based on the lasers and/or solar power, the factor power will play however a larger role in the future. The performance analysis and the determination of the efficiency makes a competent and safe control as well as the more economical use of complex plants and system processes possible. On which factors the power of the photon is dependent and how it changes quantitatively, is not clearly.

From thermodynamics we know, that the power could be determined by the temporal change of the work. The achieved work could hereby be defined by the temporal change of the process energy:

$$P = \frac{dL}{dt} = -\frac{dE}{dt} \tag{1}$$

According to the world-famous formula of Planck and to the model of the photon, that was suggested by the application in [1,2], the formula for the practical determination of the power of the light particle can be deduced. The differentiation of the formula of Plank $E = hf$ in the form

$$\frac{dE}{dt} = h \cdot \frac{df}{dt} \tag{2}$$

as well as the consideration of the rotation of the photon, that makes possible to express the time interval in the following form - $dt = d\lambda / c$, led us to the following equation:

$$\frac{dE}{dt} = h \cdot c \cdot \frac{df}{d\lambda} = h \cdot c^2 \frac{d\left(1/\lambda\right)}{d\lambda} = -hc^2 \frac{1}{\lambda^2} = -hf^2 \tag{3}$$

If we now insert this result in Eq. (1), we will have the expression for the determination of the photon power:

$$P = hf^2$$

References

1. About the dualism of the light. S. Reissig. General Conference ESP-12 “Trends in Physic”. 2002
2. About the nature of the photon. S. Reissig. /EFBR/Publikationen, 2003
3. Bewegungsgleichung der Photonen. S. Reissig. /EFBR/Publikationen, 2002

21. October 2003, Erlangen