

photon irradiance, E_p

Number of photons (quanta of radiation, N_p) per time interval (photon flux), q_p , incident from all upward directions on a small element of surface containing the point under consideration divided by the area of the element. SI unit is $\text{m}^{-2} \text{s}^{-1}$. Equivalent definition: Integral, taken over the hemisphere visible from the given point, of the expression $L_p \cos \theta \, d\Omega$ with L_p the photon radiance at the given point in the various directions of the incident beam of solid angle Ω and θ the angle between any of these beams and the normal to the surface at the given point.

Note 1: Mathematical definition: $E_p = dq_p / dS$. If the photon flux is constant over the surface considered, $E_p = q_p / S$. Equivalent definition: $E_p = \int_{2\pi} L_p \cos \theta \, d\Omega$.

Note 2: This term refers to a beam not scattered or reflected by the target or its surroundings. For a beam incident from all directions photon fluence rate ($E_{p,o}$) is an equivalent term.

Note 3: This quantity can be used on a chemical amount basis by dividing E_p by the Avogadro constant, the symbol then being $E_{n,p}$, the name “photon irradiance, amount basis”, SI unit is $\text{mol m}^{-2} \text{s}^{-1}$; common unit is einstein $\text{m}^{-2} \text{s}^{-1}$.

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