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Interpretation of black body radiation as a decay process
CLARENCE A. GALL, Division de Postgrado de Ingenieria, Universidad del Zulia, Apartado # 98, Maracaibo, Zulia, Venezuela — The treatment of black body radiation as a decay process with the wavelength (λ) as the time marker, leads to an apportioning function (D_λ) that distributes the total thermodynamic Stefan-Boltzmann emitted intensity (I) over the entire wavelength range (Clarence A Gall, BAPS, March Meeting 2007, Denver, CO). The resulting distribution function $\left(I_\lambda = ID_\lambda = \sigma \frac{T^6}{b^2} \lambda e^{-\frac{T}{b}\lambda}\right)$ gives the Stefan-Boltzmann law on integration over the same interval. Differentiation of I_λ produces Wien's displacement law as the condition for the wavelength at maximum emitted intensity (λ_m). Substitution of λ_m in I_λ yields the maximum emitted intensity (I_{λ_m}) as being proportional to T^5. Hence I_λ satisfies exactly the three known empirical laws of black body radiation and fulfils Einstein's hope for a solution of the radiation problem without the use of light quanta. Finally the replacement of $\frac{T}{b}$ with a single constant G simplifies the distribution function so that $I_\lambda = \sigma_G G^6 \lambda e^{-G\lambda}$ where $\sigma_G = b^4\sigma$. Consequently G defines a new temperature scale with units of reciprocal wavelength that unifies the thermodynamic and colour scales.

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