Abstract Submitted
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A Historical View of Kirchhoff's Black Body Universal Distribution Function (K_λ) CLARENCE A. GALL, Postgrado de Ingenieria, Universidad del Zulia, Maracaibo, Venezuela — Stefan (1879) established experimentally that Kirchhoff's total emitted intensity $K = \int_0^\infty K_\lambda d\lambda = \sigma T^4$. Boltzmann (1884) derived this result from classical thermodynamic principles. V A Michelson (1887) first defined $K_\lambda = c_1\lambda^{-6}T^{\frac{3}{2}}e^{-\left(\frac{c_2}{\lambda^2 T}\right)}$. Weber suggested $K_\lambda = c_1\lambda^{-2}e^{\left[c_3 T-\left(\frac{c_2}{\lambda^2 T^2}\right)\right]}$. Experimentally, Wien's displacement law required $\lambda_m T = b$. Paschen (1896) thus proposed $K_\lambda = c_1\lambda^{-\gamma}e^{-\left(\frac{c_2}{\lambda T}\right)}$ with $5 < \gamma < 6$. Compatibility with Stefan-Boltzmann's Law led to the value $\gamma = 5$ in Wien's solution. Planck's solution $\left(K_\lambda = c_1\lambda^{-\gamma}\left(e^{\left(\frac{c_2}{\lambda T}\right)} - 1\right)^{-1}\right)$ set $\gamma < 5$. Rayleigh-Jeans' attempt $\left(K_\lambda = c_1\lambda^{-4}Te^{-\left(\frac{c_2}{\lambda T}\right)}\right)$ is also noteworthy. From Michelson's first attempt, λT was placed in the denominator of the exponential part of the function. This did not change until Gall's derivation of the function $\left(K_\lambda = \sigma\frac{T^6}{b^2}\lambda e^{-\left(\frac{\lambda T}{b}\right)}\right)$ (http://meetings.aps.org/link/BAPS.2007.MAR.X21.4), based on emission as a decay process (sites.google.com/site/purefieldphysics), placed λT in the numerator. If temperature is defined as reciprocal wavelength then $T^6\lambda \equiv \lambda^{-5}$. It is mathematically evident that the new location of λT is what finally allowed for the exact solution of Kirchhoff's Function with the original empirical constants (σ, b)!

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