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Derivation of the True Formula for Black Body Radiation

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Introduction – The classical formula of the black body radiation is empirical. The unified absolute relativity theory gives the true formula for any emission spectrum.

Energy and frequency

$$E = hf \qquad \text{and} \qquad f = \frac{cf_0\sqrt{c^2 - v^2}}{c^2 + v\sqrt{c^2 - kf_0^{\,2}}} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad E = \frac{hcf_0\sqrt{c^2 - v^2}}{c^2 + v\sqrt{c^2 - kf_0^{\,2}}}$$

Just like for optical effects k can have different values for different frames. We know that the maximum of the curve is near the frequency $f_{M0} \approx 5\times10^{14}\,Hz$, so:

$$k_{M0} = c^2 / f_{M0}^{\;2} \qquad \Leftrightarrow \qquad k_{M0} = 3.59502071\times10^{-13}$$

(The constant v can also have a different value)

$$f_0 = f_{M0} \quad \Leftrightarrow \quad E = \frac{h\sqrt{c^2 - v^2}}{\sqrt{k_{M0}}} \quad \Leftrightarrow \quad E = 2.068eV$$

$$f_{0MAX} = \frac{\sqrt{c^2 - v^2}}{\sqrt{k_{M0}}} = 4.99992511\times10^{14}$$

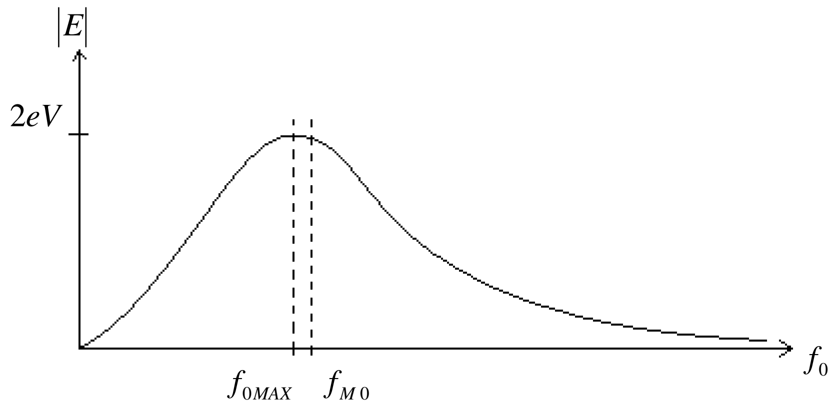
For $f_0 \geq f_{M0}$ the formula becomes complex:

$$E = \frac{hc^3 f_0\sqrt{c^2 - v^2}}{c^4 + v^2\left(kf_0^{\,2} - c^2\right)} - i\,\frac{hcvf_0\sqrt{c^2 - v^2}\sqrt{kf_0^{\,2} - c^2}}{c^4 + v^2\left(kf_0^{\,2} - c^2\right)}$$

Only the real part:

$$E = \frac{hc^3 f_0 \sqrt{c^2 - v^2}}{c^4 + v^2\left(k_{M0} f_0{}^2 - c^2\right)}$$

$$f_0 \to \infty \qquad \Leftrightarrow \qquad E \to 0$$



As we can see the curve is identical to the one of the empirical formula of Planck.

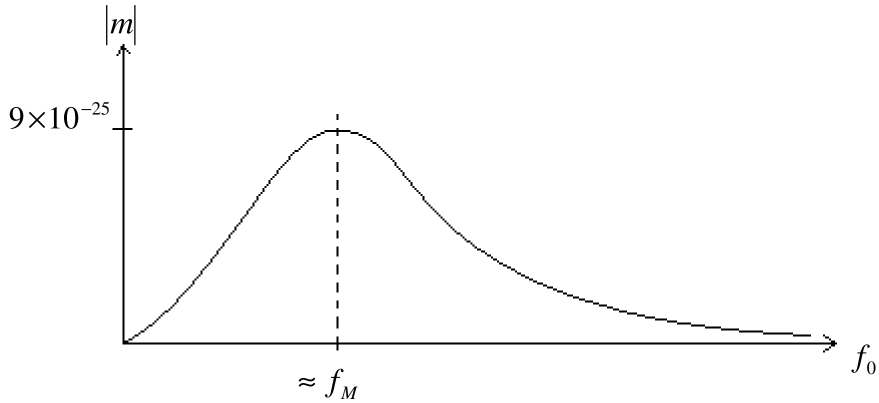
Observable mass spectrum

$$m = \frac{hf}{c^2 - kf^2} \qquad \text{and} \qquad f = \frac{cf_0\sqrt{c^2 - v^2}}{c^2 + v\sqrt{c^2 - kf_0{}^2}} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad m = \frac{hf_0\sqrt{c^2 - v^2}\left(c^2 + v\sqrt{c^2 - kf_0{}^2}\right)}{c^3\left(v + \sqrt{c^2 - kf_0{}^2}\right)^2}$$

For $f_0 \geq f_M$ the real part is:

$$m = \frac{hf_0\sqrt{c^2 - v^2}\left[c^2 v^2 - \left(c^2 - 2v^2\right)\left(kf_0{}^2 - c^2\right)\right]}{c^3\left(v^2 + kf_0{}^2 - c^2\right)^2}$$



We don't know the exact meaning of this curve but there's the hypothesis that, in the nature, the maximum limit of the observable mass of one particle is $9\times10^{-25}\,kg$ -- exactly three times the mass of the monopole. There are greater values of mass but we can't see them.

Observable frequency spectrum

$$f = \frac{cf_0\sqrt{c^2 - v^2}}{c^2 + v\sqrt{c^2 - kf_0^{\,2}}}$$

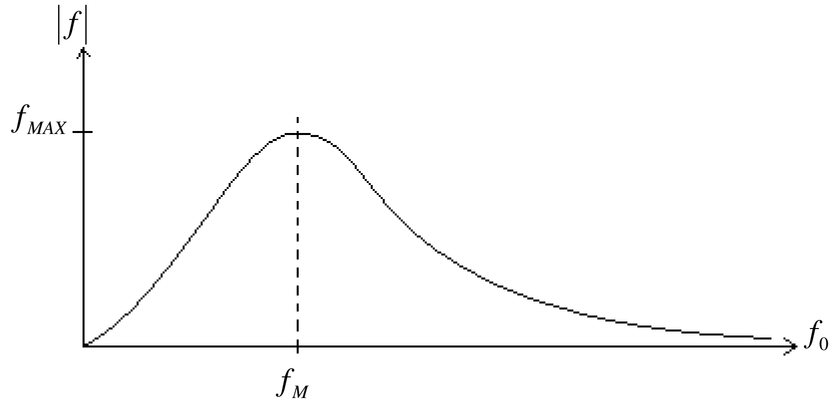
For $f_0 \geq f_M$ and $f_M = c/\sqrt{k} = 3.62681166\times10^{21}\,Hz$

$$f = \frac{c^3 f_0\sqrt{c^2 - v^2}}{c^4 + v^2\left(kf_0^{\,2} - c^2\right)} - i\,\frac{vcf_0\sqrt{c^2 - v^2}\sqrt{kf_0^{\,2} - c^2}}{c^4 + v^2\left(kf_0^{\,2} - c^2\right)}$$

Maximum observable frequency:

$$f_{MAX} = \frac{c\left(c^2 - v^2\right)}{\sqrt{k}\left(c^2 + v^2\right)} \qquad \Leftrightarrow \qquad f_{MAX} = 3.62659437\times10^{21}$$

The reference frequency spectrum f_0 goes from zero to infinite, but we only can see or measure frequencies from zero to this maximum value. ($f_M = 1.00005992\times f_{MAX}$)



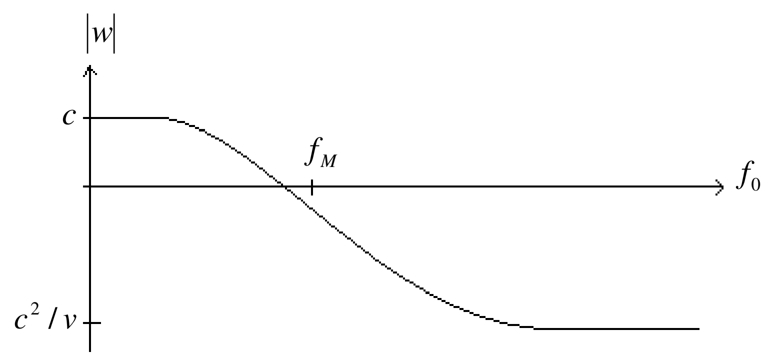
Observable speed limit of the electromagnetic waves

$$w_0 \in \left]-\infty,+\infty\right[\qquad \text{and} \qquad w_0 = \pm\sqrt{c^2 - kf_0^{\ 2}}$$

$$w = c^2 \frac{v + \sqrt{c^2 - kf_0^{\ 2}}}{c^2 + v\sqrt{c^2 - kf_0^{\ 2}}}$$

For $f_0 \geq f_M$ the real part is:

$$w = \frac{c^2 vkf_0^{\ 2}}{c^4 + v^2\left(kf_0^{\ 2} - c^2\right)}$$



Observable wavelength spectrum

$$x = \frac{x_0 + vt_0}{\sqrt{1 - v^2/c^2}} \qquad \text{and} \qquad c^2 t_0^{\ 2} - x_0^{\ 2} = k \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad x = \frac{cx_0 + v\sqrt{k + x_0^{\ 2}}}{\sqrt{c^2 - v^2}} \qquad \text{and} \qquad x_0 = \frac{\sqrt{c^2 - kf_0^{\ 2}}}{f_0} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad x = c\frac{v+\sqrt{c^2-kf_0^{\ 2}}}{f_0\sqrt{c^2-v^2}}$$

For $f_0 \geq f_M$:

$$x = \frac{cv}{f_0\sqrt{c^2-v^2}} + i\frac{c\sqrt{kf_0^{\ 2}-c^2}}{f_0\sqrt{c^2-v^2}}$$