New estimation of the Boltzmann constant and the Planck constant

Kay zum Felde

March 30, 2022

Email: kay13lalaguna@gmail.com

Abstract

We use the Einstein equation of General Relativity to compute the Planck constant h and the Boltzmann constant k.

1 Integration and computation

We compute h, k by means of Einstein's equation. Our metric is the the description of the fourdimensional sphere, i.e.:

$$x = r\cos\phi\cos\psi\cos\theta \quad (1)$$
$$y = r\cos\phi\cos\psi\sin\theta \quad (2)$$
$$z = r\cos\phi\sin\psi \quad (3)$$
$$ct = r\sin\phi \quad (4)$$

The l.h.s. of the Einstein equation,

$$G_{\mu\nu} = 8\pi T_{\mu\nu}, \quad (5)$$

is yielding $G_{\mu\nu} = 1$. The stress energy tensor is derived from the second derivation of the Faraday tensor $F_{\mu\nu}$ w.r.t. to spacetime. We specialize on the most simple example with

$$T_{xy} = 0.5\partial_x\partial_y F_{xy} \quad (6)$$
$$= 0.5\frac{\partial^2}{\partial x\partial y}\omega_y r_z - 0.5\frac{\partial^2}{\partial y\partial x}\omega_x r_z. \quad (7)$$

We are using $\vec{\omega} = (-xy, xy, 0)$.
We receive:

$$1 = 8\pi \hat{s_z} \tag{8}$$

with $r_z = \hat{s_z} = \frac{\hbar}{2}$. With $\hbar = \frac{h}{2\pi}$ we receive after inserting into eq.:

$$h = \frac{1}{2} J\dot{s}. \tag{9}$$

Now in order to compute k we set:

$$T_{\mu\nu} = k\frac{\partial T}{\partial S}\log_2 n \tag{10}$$

with T is the temperature and $k \log_2 n$ being the entropy S. To estimate k we have to solve:

$$G_{\mu\nu} d\mu = 8\pi \frac{\partial T}{\partial S} dS. \tag{11}$$

Calculating 11we receive with $\log n_2 - \log n_1 = 2 - 1 = 1$ with $n_1 = 1, n_2 = 2$,

$$r = k\dot{8}\pi \frac{\partial T}{\partial S} \tag{12}$$

Integrating both sides is yielding:

$$r^2 = T^2. \tag{13}$$

We set $k = 1/8\pi J/K$. Thus the length of some material is growing if temperature is getting higher.