

# Time – Energy Relationship an Attempt to Reinvent the Wheel

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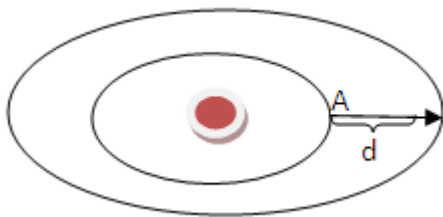
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**Abstract** Could time be another manifestation among many other manifestations of energy like mass, motion and electricity, if the answer is yes. can we convert time to energy and vice versa. Similarly just as Einstein's equation  $E = MC^2$  equalize mass to energy, time is equalized to energy in Planck's equation.

**Keywords** Time, Energy, Planck's equation

## 1. Suppose We are doing the Following Experiment

Let A be a beam of light inside an atom .the atom and the beam of light inside is moving with V velocity relative to static observer B, d is the distance traveled by A inside the atom , while T is the time elapsed as A travelled along d



$$E = hf \quad (a)$$

Where E equal to energy, h is Planck constant, f is the wave frequency

$$f = \frac{1}{T_p} \quad (1)$$

$$\therefore E = \frac{h}{T_p}$$

$T_p$  is the time period of wave

Let  $E^\circ$  be the energy Relative to B frame of reference

$$E^\circ = \frac{h}{T_p^\circ} \quad (2)$$

Where  $T_p^\circ$  is the time period of wave according to B  
Since

$$T_p^\circ = T_p \cdot \sqrt{1 - \frac{v^2}{c^2}} \quad (b)$$

$$\therefore E^\circ = \frac{h}{T_p \sqrt{1 - \frac{v^2}{c^2}}} = \frac{E}{\sqrt{1 - \frac{v^2}{c^2}}} \quad (3)$$

The time required for A to cover d according to B,  $T^\circ$ , is equal to the following

$$T^\circ = T \cdot \sqrt{1 - \frac{v^2}{c^2}} \quad (c)$$

By substituting equation c into 3

$$\frac{E^\circ}{E} = \frac{T}{T^\circ}$$

$$E^\circ = E \cdot \frac{T}{T^\circ} \quad (4)$$

$$\therefore E^\circ > E \quad (5)$$

Time dilation per say have yield extra energy according to equations 1-5, in another words the time lost in the process have been converted into energy. as a concrete example we can say that when time changes from T to  $T^\circ$ , energy will also change from E to  $E^\circ$ .

By the same logic we can wonder whether losing or adding energy could lead to change in time, and that is what equation 7 predict as time  $T^\circ$  is inversely proportional to energy  $E^\circ$ .

The usual mental habit of relating the time period of wave to its energy can be broken if we look to it from another perspective.

Let  $d = \lambda$ , where  $\lambda$  is the wave length of beam A  
Since

$$\frac{d}{T} = c, \frac{\lambda}{T_p} = c \quad (6)$$

$$\therefore T = T_p$$

By substituting equation 1 and 6 in 4

$$E^\circ = \frac{hf \cdot T}{T^\circ} = \frac{h}{T^\circ} \quad (7)$$

science history shows that a similar reflections by Debrogli led to the realization that not only waves might sometimes

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act as a particle but that particles such as electron could also act as a wave, as follow:-

$$\lambda = \frac{h}{P} \quad (d)$$

Where,  $\lambda$  is the wave length,  $h$  is Planck's constant,  $P$  is the momentum

Although counterintuitive, mathematical equations depict this possibility.

## 2. Conclusions

Our experiment tells us that time in general is equivalent to certain amount of energy and that time and energy are related to each other by the same mathematical formula that relates the time period and wave energy, Planck's equation .

According to equation 7 we can say that the energy contained in one minute is less than that contained in one second.

Metaphorically speaking, one can look to the matter from another perspective as follow, just similar to what joule had done when he invented his big apparatus by which he found the heat equivalent of energy, the same can be applied in our case except that max Planck has used, instead of joules giant machine, a tinny electromagnetic wave to find the time

equivalent of energy.

Scientist didn't yet find a natural phenomenon that relates time to energy except in electromagnetic waves, so until this happens perhaps Planck's equation is providing the answer for a future dilemma just like what Einstein equation did when it explained where did the lost mass had gone after a nuclear fission.

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