

Work in progress  
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## Energy cannot be quantized in particles called photons

De Broglie waves refute photon energy  $E = h\nu$  because it implies a phase velocity greater than  $c$

Meaning of Planck's  $h$ :

$h = 2m_e c^2 / \nu^*$  where  $2m_e c^2$  is the binding energy of an electron-positron pair in the aether and  $\nu^*$  is the resonance frequency of this aether.

## Impossible properties of the notion of a photon prove its nonexistence

### Summary

Energy is the measure of the work done and not an object with discrete parts.

The energy atom of Planck and Einstein is a category mistake.

No inference from energy/frequency curve to incident energy lumps  $E = h\nu$  possible!

There are empirical indications that the energy of a wave at frequency  $\nu$  is not  $E = N h \nu$ , where  $N$  is the number of energy atoms or photons.

For an electron ( $m, v$ ) its de Broglie wave has wave length  $\lambda = h/mv$ .

With the alleged photon energy  $h\nu = mc^2$

as the second premise one can derive the phase velocity of the electron wave  $u = \lambda\nu = c^2/v$

Because  $u > c$  is impossible, premise  $h\nu = mc^2$  must be wrong! Lorenz Schauer derived many fallacies in Planck's "derivation" of  $E = h\nu$ . Planck presupposed  $E = h\nu$ , therefore his energy lumps are a product of circular reasoning.

Planck's construction of  $h$  is more down to luck than good judgment!

Planck's  $h$  is a constant of proportionality for the ratio  $h = 2m_e c^2 / \nu^*$  where  $2m_e c^2$  is the binding energy of an electron-positron pair in the cosmic dielectric aether and  $\nu^*$  is the resonance frequency of this aether.

### Preface

Planck received the 1918 Nobel Prize for "his discovery of energy quantization".

In this article we are concerned only with the introduction of energy quanta, namely the claim that energy is not an immaterial measure, i.e. a bookkeeping device, but a physical entity that can be divided into energy atoms  $h\nu$ . Energy atoms or *photons* are the cornerstone of current quantum mechanics (QM):

*Understand that energy is also quantized in particles called photons.*

This sentence of Terence Baine is a learning objective of a CERN teaching resource!

[http://education.web.cern.ch/education/Chapter2/Teaching/anti\\_matter/teachers\\_corner](http://education.web.cern.ch/education/Chapter2/Teaching/anti_matter/teachers_corner).

Planck and Einstein are the Early Fathers of quantum mechanics. According to QM radiant energy can be viewed as a stream of  $N$  photon bullets that represent energy bundles of amount  $E = N h \nu$  ( $N = 1, 2, 3, \dots$   $\nu =$  frequency). Note please that these streams of photons spread out with velocity  $c$  in the presupposed vacuum.

Historically, radiation was thought of as an electromagnetic wave of an aether that propagates through this medium by inducing transverse electric and magnetic stresses and strains.

Obviously these transverse forces cannot explain the observed pressure of light in the direction of radiation propagation. On the other hand photon impacts can explain light pressure. Therefore these two views cannot be reconciled to one another.

The photon as a physical energy atom cannot exist because energy is immaterial; it is a measure and a bookkeeping device only. The photoelectric effect can be explained in terms of wave theory, namely as a resonance phenomenon, see below.

Niels Bohr's destructive criticism of the concept of a photon is based on the uncontroversial wave interference that is not explainable in terms of quanta that possess frequency but not amplitude. Moreover, particles cannot possess frequency...

If a particle-wave with energy  $E = N h \nu$  ( $N =$  the number of photons) interfer with a particle-wave with also  $E = N h \nu$ , QM cannot explain the process that produces a radiation with energy  $E = 2 N h \nu$ !

Niels Bohr's Nobel lecture 1922:

*The hypothesis of light-quanta, which is irreconcilable with so-called interference phenomena, is not able to throw light on the nature of radiation.*

*I need only recall that these interference phenomena constitute our only means of investigating the properties of radiation and therefore of assigning any closer meaning to the frequency which in Einstein's theory fixes the magnitude of the light-quantum.*

A wave theory of radiation requires the following prerequisites:

- 1: To explain pressure of light the medium (the carrier of the wave) must be capable to form longitudinal waves in that they oscillate in the same direction as their propagation.
- 2: The medium should render possible both longitudinal and transverse waves because polarization is a property unique to transverse waves.
- 3: The observed torque of light radiation requires a torsional wave. (In terms of QM, the torque is due to photon spins!) So a torsional wave unites points 1 and 2. Of course, the structure of the aether and the type of wave are not designed till now.
- 3: But there are arguments that the aether comprises electron-positron pairs as basic building blocks. For example, the function of broadcasting and of a capacitor requires an aether that is built up of  $\pm$  charges.

Also the propagation of electromagnetic waves require charges.

## **Planck's introduction of energy lumps $h\nu$**

What means black body radiation? Any hot body radiates. The radiated spectrum, the energy/frequency curve, depends on the material. But if we heat a cavity with a small opening, the thermal radiation spectra for all materials is the same, why?

(Already Kirchhoff realized that cavities of different materials radiate in the same fashion.)

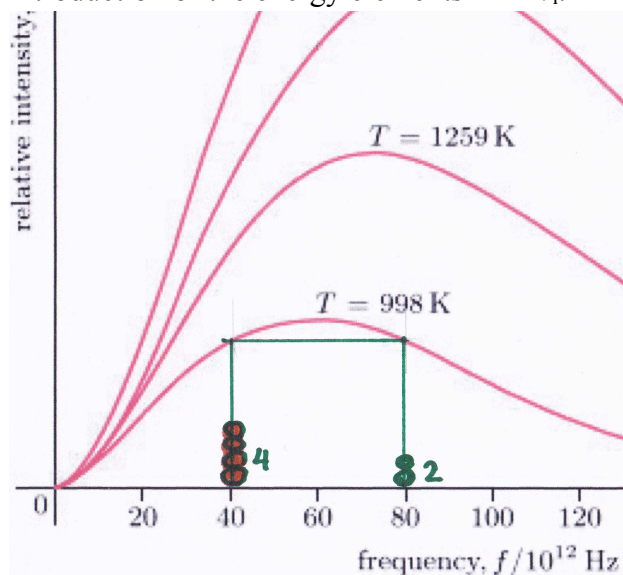
A particular material, say iron, has specific eigenfrequencies that differ from, say gold. But in any case waves with eigenfrequencies are reflected and interfere with waves of different frequencies (and amplitudes!). The result is a broad mix of different waves that show the uniform radiant spectrum of black body radiation.

Planck had the misleading idea to explain the uniformity of cavity radiation for different

materials by the heuristic introduction of a lattice of elastically bound little charges, his famous *resonators*.

He invented these resonators in order to derive theoretically the energy/frequency function. Any resonator is characterized by its eigenfrequency  $\nu$ , and the resonator can absorb or radiate energy only in lumps  $E = N h \nu$ ,  $N = 1, 2, 3, \dots$

This "as if" lumps produced much confusion, as we shall see... Let us clarify Planck's introduction of the energy elements  $\epsilon = h\nu_i$ .



The graph shows Planck curves. Here the intensity is plotted as a function of frequency  $\nu$ . (Regarding the number of energy atoms intensity or energy at the ordinate doesn't matter.)

Regarding the curve for 998° K, the energy  $E$  is the same for both  $\nu_1 = 60$  and  $\nu_2 = 120$ . According to Planck,  $E$  consists of  $N_1$  energy elements  $h\nu_1$ :  $E/h\nu_1 = N_1$ . Because for frequency  $\nu_2 = 120$  the energy is the same as for 60, the number of energy lumps emitted must vary:  $E/h\nu_2 = N_2$ . In this case  $N_2 = N_1/2!$

If in the graph there are for instance 4 energy lumps  $E = 4 h\nu_1$  at frequency  $\nu_1$  then at  $\nu_2$  there must be 2 energy lumps  $h\nu_2$

Sheer not plausible reasoning! What's the cause, what's the effect of this process? This is an arbitrary *ad hoc* stopgap in order to save a theory that has no causal explanation. In the 19<sup>th</sup> century physicists assumed that the amplitude for the radiation with frequency 120 is 50% of the amplitude at frequency 60! Planck invented waves with frequency but without amplitude!

Bohr's argument that interference phenomena exclude Einstein's and Planck's wave energy atom  $E = h\nu$  found no resonance.

The present author emphasizes that the wave theory of radiation can explain the same shape of the black body radiation irrelevant of the material of the cavity. Numerous interferences play the role of uni-forming the radiation spectra!

*Kragh*, a historian of science, shows that the idea of energy lumps was not fully matured in the early papers of Planck: For Planck the energy was

*"made up of a completely determinate number of finite equal parts, and for this purpose I use the constant of nature  $h = 6.55 \times 10^{-27}$  (erg sec)"...*

*"this constant, once multiplied by the common frequency of the resonators, gives the energy element epsilon in ergs, and by division of  $E$  by epsilon we get the number  $P$  of energy elements to be distributed over the  $N$  resonators".*

*Kragh: Quantum theory was born. Or was it? Surely Planck's constant had appeared,... But the essence of quantum theory is energy quantization, and it is far from evident that this is what Planck had in mind. As he explained in a letter written in 1931, the introduction of energy quanta in 1900 was*

*"a purely formal assumption and I really did not give it much thought except that no matter what the cost, I must bring about a positive result".*

*Planck did not emphasize the discrete nature of energy processes and was unconcerned with the detailed behaviour of his abstract oscillators. Far more interesting than the quantum discontinuity (whatever it meant) was the impressive accuracy of the new*

*radiation law and the constants of nature that appeared in it.*

Comment:

That the physicists of the early 19<sup>th</sup> century did not pull to pieces Planck's confused thinking gives evidence for the disastrous state of ontology among physicists. Of course there are no separated oscillators. The cavity is a lattice oscillator with many degrees of freedom. Dependent on temperature there are many eigenfrequencies. The waves emitted are aether waves, these waves produce via interference the radiation distribution of the aether inside of the cavity. That's all! And the constant  $h$  determines the shape of the radiation curve for the temperature  $T$ .

Anyone who is interested to know today's textbooks interpretation of black-body radiation in connection with Planck's introduction of energy quanta is referred to the explanations of Michael Fowler:

[http://galileo.phys.virginia.edu/classes/252/black\\_body\\_radiation.html](http://galileo.phys.virginia.edu/classes/252/black_body_radiation.html);

<http://galileo.phys.virginia.edu/classes/252/PlanckStory.htm>

Therefore we must not go into the details. Some topics of Fowler show Planck's approach: *Planck's Thermodynamic Approach: Oscillators in the Oven Wall Oscillator... Thermodynamics: Planck Focuses on Entropy*

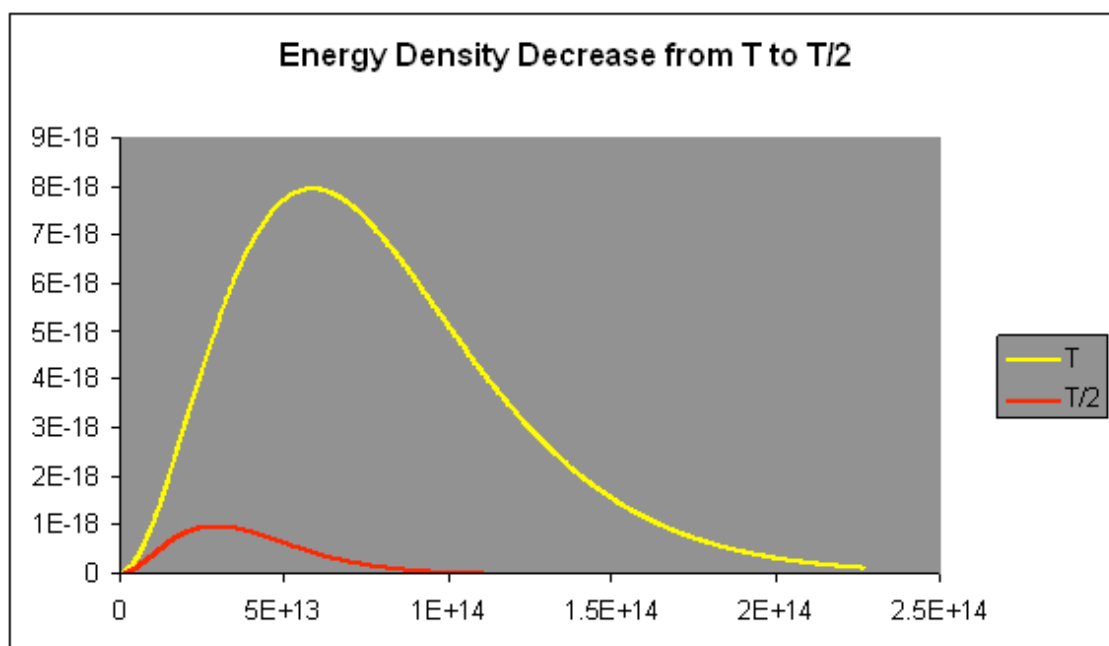
Our interest focuses not on entropy but on the revolutionary creation of the energy atom  $E = hv$ . Citation of Fowlers inference:

*... the entropy expression tells us this energy is distributed among the oscillators in discrete chunks each of size  $hv$ .*

This conclusion cannot be drawn from Planck's premises. The entropy expression is not a prove for the existence of energy atoms. Entropy cannot tell us how the resonators produce energy quanta. Even for a perfect atom model only quantized natural frequencies would be explainable but not emitted energy lumps  $hv$ .

Obviously, Fowler did not notice Planck's category mistake, namely that energy is a relation and not a substance that can be divided. Most contemporary physicists take the existence of photons for granted. They refer to the photoelectric and the Compton effect. But these effects can be explained in terms of wave theory, too. See please the articles regarding these effects.

### **Additional objections to photon theory**



Regarding the so-called black body radiation, we see in the graph (source: Fowler) intensity versus frequency domains with quasi linear increasing or decreasing intensity (or Energy density) but the slope is dependent on the temperature of the body, which emits radiation!

The graph from Fowler shows Planck's curve for 1000° K (shown yellow) and for 500° K (shown red). The frequency for the maximum intensity at 500° K

is  $\nu = 2,939 \cdot 10^{13}$ . The frequency for the maximum intensity at 1000° K is  $2\nu$ !

The curve  $\rho(\nu, 1000^\circ \text{ K})$  then reaches *eight* times the height of  $\rho(\nu, 500^\circ \text{ K})$ .

In terms of Planck's theory this means that for the 500° K curve if there are  $N$   $h\nu$  energy lumps at the peak, for the 1000° K curve must exist  $4N$  energy lumps with energy  $h(2\nu)$ : ( $8N h\nu = 4N h(2\nu)$ ). Defenders of energy quanta never gave *the rationale* for his theory.

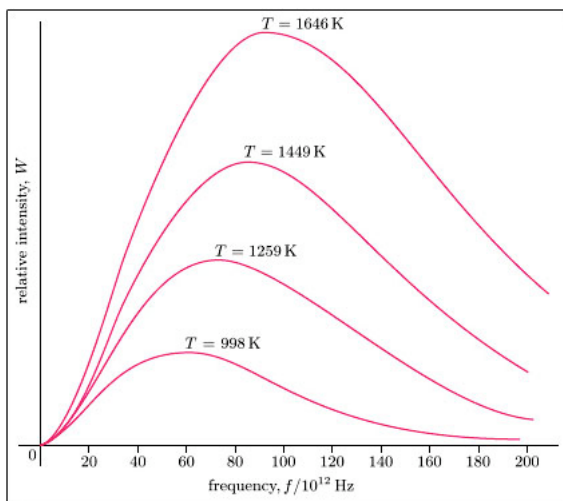
Because the intensity of waves depends on frequency and amplitude, an explanation in for the ratio of amplitudes of the two cases is possible.

Premise:  $\rho \propto \nu^2 A^2$ .

The amplitude at the peak of the 500° K curve is  $a$ , that of the 1000° K curve is  $A$ .

Then the relation holds:  $8 \nu^2 a^2 = (2\nu)^2 A^2 \rightarrow A^2/a^2 = 2$ .

Result: If temperature  $T$  is doubled, also the ratio of the amplitudes squared and the ratio of the frequencies for the peaks is doubled! (Also the slopes of the curves have approximately the ratio 2 : 1.



For very low frequencies Planck's curve is parabolic. Because in this case intensity depends on frequency squared  $\rho \propto \nu^2$ , the amplitude remains constant if  $\rho$  must depend on amplitude too:

$$\rho \propto \nu^2 A^2: \\ \nu^2 = \nu^2 A^2 \rightarrow A = \text{const.}$$

Have a look at curves for high temperatures  $T$ . The increase of intensity is disproportionate to frequency, the slope or steepness of the curve is great, this indicates that increasing frequency is accompanied by increasing amplitudes. By analogy for low  $T$  increasing

frequency is accompanied by decreasing amplitudes.

Have now a look for curve  $T = 1000^\circ \text{ K}$  (graph above). Where an interval of curve can be treated approximately as a straight line, then there intensity is  $\rho \propto \nu$ . Because intensity depends in reality on amplitude and frequency:  $\rho \propto (\nu A)^2$ , amplitude must vary inversely proportional with frequency:

$$A^2 \propto C/\nu = C \lambda/c.$$

( $C$  is a constant  $C(h)$ ,  $\lambda\nu = c$ )

As the frequency increases beyond the frequency for the peak, the curve is dropping. This means that amplitudes decrease with further increasing frequencies.

So the curve shows properties of the waving of something: it is the dielectric aether.

Planck developed the envelope-formula for the relationship between the emitted energy and wavelength or frequency, respectively. Planck especially found a constant, labeled  $h$ , that made it possible to generate curves that coincide with the empirical results!

Because an envelope can comprise different states or regions, Planck's  $h$  must not be the exact constant that governs the waving dielectric aether. Planck's  $h$  may do this job approximately. Then one must ask the question: We have two  $h$ 's, one for the

blackbody radiation, the other for de Broglie waves. Are the two  $h$ 's identical? Below we can clear this question.

Planck assumed that the oscillators that effect the black body radiation emit and absorb energy only in discrete amounts, the famous energy quanta or photons that contain energy of  $E = h\nu$ . These energy packets are flying through the vacuum. There is no empirical confirmation for the existence of energy lumps

When a formula for the radiation works for an inserted factor  $h$ , the existence of a photon cannot be inferred...

Additionally Planck arbitrarily assumed that the energy emitted consists of shots of  $N$  energy atoms that contain energy of  $E = h\nu$ .

Planck's approach via thermodynamics was an indirect one. Planck's resonators are simple harmonic oscillators. 100 years after Planck we do not have exact knowledge on the true nature of atomic oscillators. The present author rejects the current atom model that comprise a proton-neutron nucleus and surrounding electron clouds.

Planck and our contemporaries like Fowler have not the slightest idea how a photon can be created during an oscillation.

Planck made solely an interpolation between the unsatisfactory formulas of Wien and Rayleigh in order to fit the data at all frequencies. Also from this curve fitting it is not possible to infer that resonators (= atomic oscillators) emit or absorb only energies from a discrete set, made of integer multiples of an energy atom:  $E = h\nu$ , where  $\nu$  is the frequency of the oscillators. The intensity of radiation of  $\nu_i$  is thought of as due to a successive bombardment of energy atoms  $h\nu_i$ .

*Fowler repeats the fundamental error of Planck's reasoning:*

*The bottom line is that he found he could account for the observed curve if he required these oscillators not to radiate energy continuously, as the classical theory would demand, but they could only lose or gain energy in chunks, called quanta, of size  $hf$ , for an oscillator of frequency  $f$ . The constant  $h$  is now called Planck's constant,  $h = 6.626 \times 10^{-34}$  joule.sec.*

Remarkable is that radiation energy according to Planck depends on frequency only. The resonators that cause radiation have amplitude too! Planck did not mention it... The dimension of

$E = h\nu$  is Hertz, Hertz is not the dimension of energy. Recall that a constant or proportionality in a natural law has no dimension!

The founders of the energy lumps are Planck and Einstein together. Planck is the forerunner, Einstein developed this idea further. Einstein called the energy lumps of radiation *photons*. Photons are thought of as bullets with momentum, later also with spin...

Allegedly Planck could account for the observed curve *if* he required these oscillators not to radiate energy continuously, as the classical theory would demand, but (allegedly, J.M.) *they could only lose or gain energy in chunks, called quanta, of size  $hf$ , for an oscillator of frequency  $f$ .*

Planck's essential presupposition in deriving his formula was that the oscillators only exchange energy with the radiation in quanta  $hf$ . Einstein made clear that the well-understood standing electromagnetic waves, the radiation in the oven, also have quantized energies the energies are now in steps  $hf$  apart. Remark: A standing wave is the result of interference of two waves. Einstein cannot explain interference of photons.

## Epistemology of physics, category mistakes

In physics most category mistakes are ontological errors concerning the basic categories of inorganic being and their relations. According to *wikipedia* by a category error a property is ascribed to a thing that could not possibly have that property.

Concise: category mistakes = misascription of properties.

Or we can say that a category mistake is an error of logic where concepts belonging to different categories are inappropriately related. ([encarta.msn.com/diction](http://encarta.msn.com/diction))

Examples: time dilatation, space expansion. Time and space are not objects that can decelerate or expand, respectively. Time and space are relations and measures.

Planck introduced in 1900 the category mistake of energy quanta. Planck's misascription of properties is a manifold one.

Regarding the definition of energy,

$$E = \int \mathbf{F} ds,$$

both, force  $\mathbf{F}$  and space  $s$  are continuous entities. So, energy cannot be discontinuous.

Then energy is by definition not a thing that can be divided into parts, and what is more: into atoms. Energy is a relation. It is the measure of the effort that must be done for example to elevate a weight or the amount of energy that is stored in a compressed spring. In the principle of conservation of energy, the energies function as bookkeeping devices only.

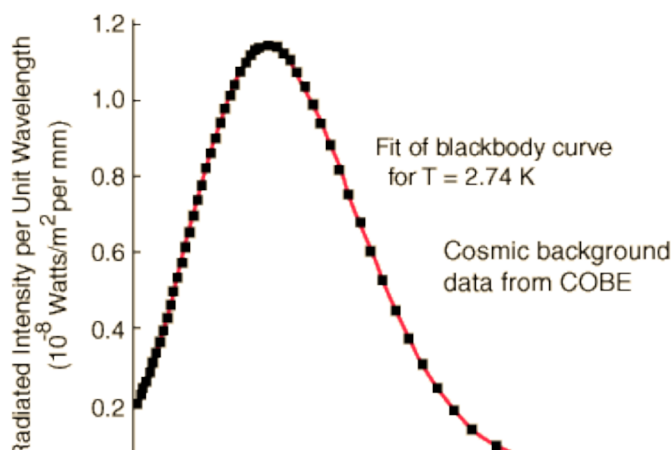
**Lorenz Schauer** derived many fallacies in Plank's "derivation" of  $E = h\nu$ . It is impossible to derive  $E = h\nu$ , Plank presupposed it! Schauer's investigation is in German: <http://www.quantenkritik.de/4481.html>

We must ask the question: How was it possible that a university professor made such an unpardonable category mistake, and moreover: how was it possible that the leading physicists of that time awarded Planck with the Nobel price?

*Edgar Snow* explained such a possibility by his thesis of the *two cultures*.

There is a severe separation between natural sciences and the humanities. To some extent physicists ignore philosophy, even philosophy of science. They pretend that physics is an exact science that with the recent *standard model* of QM achieved great triumphs. Philosophy is for most physicists characterized by a permanent disparity of views. Therefore they argue: What is the use of the logic of notions? Nothing!

The fact that natural sciences segregated from natural philosophy is the cause for its flawed axiomatic.



**The infinite cosmos  
functions as a cavity  
The thermal radiation of  
the cosmic aether is 2,74°  
K  
Cosmic radiation is not  
the remainder heat of the  
big bang!**

The following graph  
Nave C R., <http://hyperphysics.phy->

astr.gsu.edu/hbase/hframe.html

shows the fit of the blackbody curve for the cosmic 2,74° K microwave background radiation (CMB-radiation). The data are from COBE satellite.

(Also a CMB teperature of 2.725° K is reported, but this does'nt matter here.)

Background radiation is not the remainder heat of the big bang that has never happened.

Big bang theorists are not able to give reasons for the bell-shape background radiation that is in coincidence with Planck's cavity radiation formula!

Big bang "theory" can be refuted in a few words: Big bang theorists explain the red shift of galaxy radiation due to the expansion of empty space (and not due to Doppler!). The claim is that the expansion of the space must expand light waves too. Therefore the red shift is allegedly due to expanded light waves!

Thinking at space that can undergo expansion, contraction or curvature is a category mistake! Space is a relation and not a thing.

Because the Big Bang never happened we must develop a reasonable interpretation of the background radiation.

Because blackbody curves and the cosmic background curve have the same shape, the idea suggests itself that the same medium is waving.

This cosmic microwave radiation represents the vibrations of the all-pervading cosmic dielectric medium, which serves as the *preferred reference frame*.

Obviously, the observed thermal radiation represents the eigenfrequencies and the frequencies due to interference of the all- pervading cosmic dielectric medium, which was set going into forced oscillations by the exciting oscillators. So the back ground radiation is an effect of all radiating galaxies.

Black body radiation occurs in a cavity. If one insert the cosmic temperature of 2,74° K in Planck's formula for black body radiation one obtains a function that fits the measurements. Where is the „cavity“ for this CMB radiation?

Background radiation occurs also in a "cavity". The infinite cosmos functions as a cavity... Excited atoms of galaxies are the input for aether vibrations that we measure as background vibrations.

### Regarding the photon spin, recent standard model is confusing

Let's cite wikipedia: [http://en.wikipedia.org/wiki/Atomic\\_orbital](http://en.wikipedia.org/wiki/Atomic_orbital)

*Orbitals table:* This table shows all orbital configurations for the real hydrogen-like wave functions up to 7s, and therefore covers the simple electronic configuration for all elements...

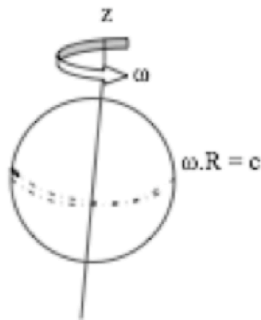
	s (l=0)	p (l=1)						
	m=0	m=0	m=±1					
	s	pz	px	py				
n=1								
n=2								
n=3								

Of importance is that for the standard model all so called s- electrons don't orbit the nucleus!

Therefore the prescription of Bohr that the angular momentum of the electron is quantized with n:  $L = n \hbar$  is abandoned.

For the H-atom for example the electron for  $n = 1$  and  $n = 2$  does not orbit. It should crash into the nucleus, but Pauli, Hund, etc justify their rules not physically!  
 As a consequence of this rules we have the hydrogen electron on  $n = 2$  without angular momentum ( $L \neq 2\hbar$ ) and therefore, if the electron takes the jump to the  $n = 1$  orbit, there is no need that the photon carries away the spin  $\hbar$ .

For the old Bohr H-atom there would be spins 1, 2, 3,... I can show this.



If one derives a constant photon spin due to another model, I argue that spin as such is not reasonable.

First objections to photon spin are based on the lack of plausibility for a photon spin:

Definition of spin:  $J = I \omega$ ;  $I = \int r^2 dm$ ;

for mass distributed along the equator, velocity  $c$ :

$$I = m R^2 \quad \omega = c/R$$

$$h\nu = hc/\lambda = mc^2 \rightarrow m = h/c\lambda \rightarrow I = R^2 h/c\lambda. \rightarrow J = I$$

$$\omega = R h / \lambda.$$

$$\text{for } R = \lambda/2\pi \rightarrow J = h/2\pi = \hbar.$$

The wavelength  $\lambda$  and  $R$  must be in the same order of magnitude, for example:  $R = \lambda/2\pi$   
 Then for a broadcasting wave of 628 m the photon radius is 100 m! Only a photon-phantom could pass walls... and could conserve spin!

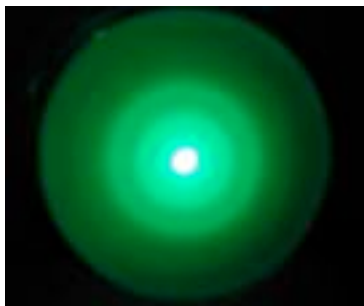
Regarding the birth of the photon, it must gain velocity and spin instantly! Photon-Photon collisions are unknown...

The photoelectric effect is no argument for the existence of photons. It can be explained with waves: electrons can be liberated with resonance frequencies.

The metal surface can be thought of to be an antenna with a specific bandwidth...

### De Broglie's matter waves

Both, Bohr + Schrödinger argue with the duality of wave and electron, that's nonsense.



Physics needs causality, not mystery.

Causal Explanation of „electron waves“:

An electron beam passes a crystal. At the target there are the hits of the electrons (a white circular area). But there are also the phenomena of waves visible. This is not due to electron waves that are coexisting with electrons. In reality the electrons cause accompanying waves in the aether (analogy: bullets in the air cause sound waves ).

De Broglie's formula  $\lambda = h/mv$  should have a causal and physical interpretation:

The moving electron creates an accompanying wave in the aether. The  $h$  is a constant of proportion of that aether. See below the explanation. Causality, not duality!

### Empirical indication that the energy of a wave is not $E = N h\nu$

or

### de Broglie waves refute Planck's energy lumps

According to the duality doctrine of corpuscle and wave an electron is also an electron-wave. According to de Broglie the wavelength is  $\lambda = h/mv$ , where  $v$  is the velocity of the electron,  $m$  is its mass.

This formula is experimentally confirmed. So we write cautiously this relationship as an **empirical rule**:  $\lambda \sim h/mv$

If the electron wave is an electromagnetic wave (what else?) its phase velocity should be  $c$ . (Of course the velocity of electromagnetic radiation in a crystal is  $< c$ , but for the small path we neglect this.)

For electromagnetic waves holds:  $c = \lambda\nu$ , therefore:  $\nu \sim mv c/h$

According to current QM theory the electron-photon energy is  $E = h\nu$  and the energy of its double nature as an electron is  $E = mc^2$  (for  $v \ll c$ ).

Therefore current theory equates the two expressions for the energy (duality of energy of wave and corpuscle!) and obtains:

$$h\nu = mc^2 \rightarrow \nu = mc^2/h$$

Now textbooks calculate the **phase velocity  $u$  of the electron wave** by:

$$u = \lambda\nu = (h/mv) (mc^2/h) = c^2/v !$$

If we calculate the phase velocity of the electron wave for an electron with  $v = c/100$  we obtain  $u = 100 c$ ! For  $v = c/1000$  we obtain  $u = 1000 c$ , and so on.

A textbook "explains": The phase velocity *is greater than the velocity of light, because the particle velocity  $v$  is smaller than the velocity of light.*

No comment necessary!

The cited derivation of QM has two premises:

1:  $\lambda = h/mv$

2:  $h\nu = mc^2$

Because the conclusion

$$u = \lambda\nu = c^2/v$$

is false but premise # 1 ( $\lambda \sim h/mv$ ) is empirically valid, premise # 2 must be wrong!

There is whether a rest energy  $E = mc^2$  nor a electron-photon-energy  $E = h\nu$ .

So Planck's  $E = h\nu$  is refuted by experiment!

Premise # 2 serves also for the calculation of photon mass:  $m = h\nu/c^2$ .

Wrong even for a non existing photon!

**Two  $\gamma$ - photons cannot create matter with charge and charge and spin:**

$$+ \gamma \rightarrow e^+ + e^-$$

Allegedly 2  $\gamma$ -photons of energy  $> 1,022 \text{ MeV}$  create an electron-positron pair (= Positronium, **Ps**).

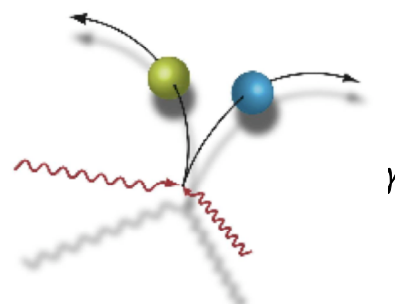


FIG. 3: Pair production through photon interaction.

The of **Ps** is not due to a transformation of energy into inert mass that takes place in vacuity.

This explanation ignores first of all that the charges of both the electron and the positron are created out of nothing (*creatio ex nihilo*), which is impossible. And before the two charges neutralize each other they must be existent!

Instead of this misinterpretation there is every indication that positronium is not created but existed before and can be liberated:

Positronium is assumed to be the building block of a dielectric aether that can be liberated with a  $\gamma$ -ray of  $E \geq 1,022 \text{ MeV}$ . But this liberation of Ps is only possible in the presence of a "catalysator", namely a molecule. The lattice of the molecule acts obviously as a buffer in order to bounce the positronium.

The energy necessary to liberate Ps is  $2m_e c^2 = 1,022 \text{ MeV}$

but this is the binding energy of Ps in the aether and not the rest energy of the electron and the positron.

This understanding is helpful to clarify

**the meaning of Planck's constant h:**

If the energy necessary to liberate Ps is  $2m_e c^2 = 1,022 \text{ MeV}$  then the frequency corresponding to this energy must be a resonance frequency  $\nu^*$  of the dielectric aether:

$$h\nu^* = 1,022 \text{ MeV} = 2m_e c^2 \rightarrow h = 2m_e c^2 / \nu^*$$

The meaning of h:

It is a constant of proportionality for the ratio:

binding energy  $2m_e c^2$  of Ps to resonance frequency  $\nu^*$  of the aether.

h has nothing to do with energy lumps.

$$h = 4,135667 \cdot 10^{-15} \text{ [eVs]}, \nu^* = 2m_e c^2 / h = 1.022 \cdot 10^6 \text{ [eV]} / 4,14 \cdot 10^{-15} \text{ [eVs]} = 2,4712 \cdot 10^{20} \text{ [1/s]}$$

$$\lambda^* = c / \nu^* = 2,99792 \cdot 10^8 \text{ [m/s]} / 2,4712 \cdot 10^{20} \text{ [1/s]} = 1,213 \cdot 10^{-12} \text{ m} = 2 \lambda_C.$$

$$(\lambda_C = 2,4263 \cdot 10^{-12} \text{ [m]})$$

**The meaning of h for de Broglie waves:**

$$\lambda = h / m_e v \rightarrow h = \lambda m_e v$$

$$h = (c/v) m_e v = 2m_e c^2 / \nu^* \text{ (from above)} \rightarrow \nu / \nu^* = v / c,$$

i. e. the ratio of the deBroglie wave frequency to the aether resonance frequency correspond to the ratio  $c/v$  where  $v$  is velocity of the electron that causes the deBroglie wave. This seems reasonable!

**The Josephson effect** is simply a statement for the energy/frequency relation

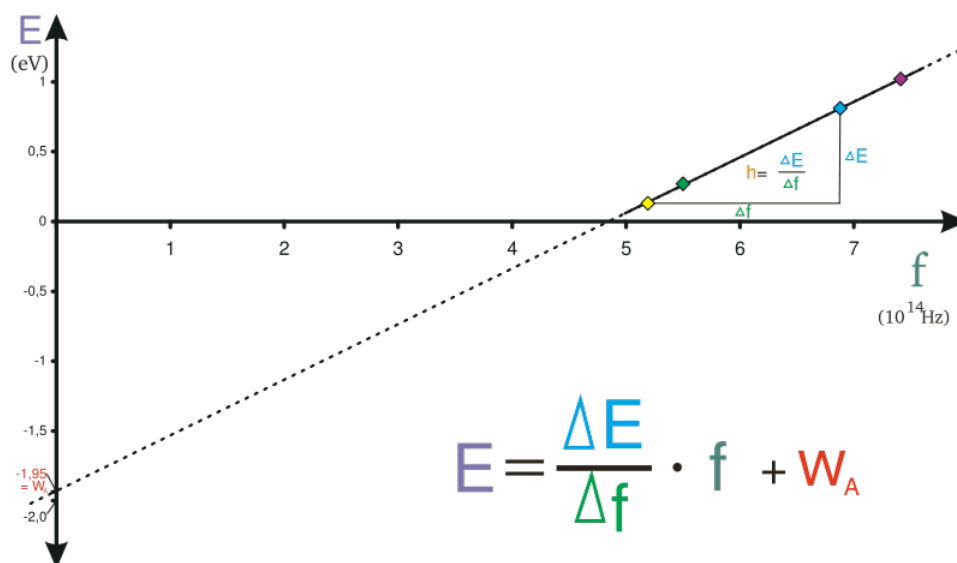
$$2eV / \nu_J = h$$

and has nothing to do with travelling energy lumps  $h\nu$ .

**The photoelectric effect does not prove the existence of photons**

Graph: [wikimedia.org/wikipedia/commons/thumb/d/da/FotoelektrischerEffekt](https://commons.wikimedia.org/wiki/File:FotoelektrischerEffekt)  
 above it was shown that the meaning of h is the ratio: binding energy of positronium to resonance frequency that liberates Ps  $\rightarrow h = 2m_e c^2 / \nu^*$

The analogue hold for the photoelectric effect:  $h = E_B / \nu^*$ , where  $E_B$  is the binding energy of a surface electron of the metal. The surface of the metal is an antenna, any metal has a band of frequencies.

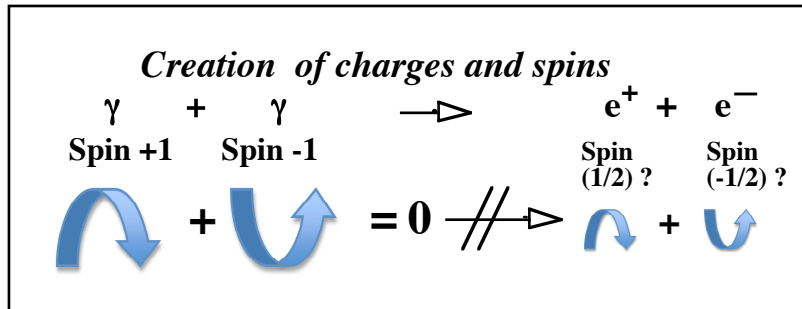


$$E = \frac{\Delta E}{\Delta f} \cdot f + W_A$$

**Calculation of spins for the alleged pair creation:**

pins:  $\gamma$ -photon spins + and - cancel out. Then the spin creation of positronium occurs. Also charges are created ex nihilo!

Mass of Ps is due to transmutation of energy according to  $E=mc^2$ .



This not physics, it is magic!

Causal interpretation (Simhony):

The electron-positron pair, Ps, is bound in an aether structure. State of our ignorance: The

structure of this particulate aether is unknown! But Ps must have a binding energy. If the energy of the gamma rays is greater than this binding energy, the Ps can be liberated and the electron and the positron begin to spin. (There is no need for them to spin in the bound state.) The details of this liberation process are not known, we know that for this liberation a heavy nucleus (anvil?) must be near by.

Important is that  $E = mc^2$  is not the rest energy of Ps but the binding energy of Ps.

If  $E = mc^2$  is the binding energy, then we can calculate the velocity of light waves in the aether:

Speed of sound is  $c = \sqrt{B/\rho}$

bulk modulus in Pascal,  $1Pa = 1N/m^2$ , N... Newton,

Meter. density  $\rho = \text{mass/volume} = m_e/m^3$ .

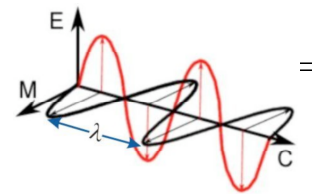
Multiplying both B and  $\rho$  of the ratio  $B/\rho$  with  $m$  (meter) we get:

$= Nm/m^3 = 1 J/m^3$ . J... Joule, the dimension of energy!

The bulk modul expresses therefore the density of binding energy.

$\rightarrow c = \sqrt{(m_e c^2 / m^3) / (m_e / m^3)} = \sqrt{m_e c^2 / m_e} = c!$

This is the speed of elastic torsional aether waves that cause pressure and angular momentum of light. Because the elastic waves are vibrating charges of electrons and positrons,



there are accompanying electromagnetic waves

E, M. These transverse waves cannot cause pressure and angular momentum!

The reverse process  $e^+ + e^- \Rightarrow \gamma + \gamma$

is not a physically impossible annihilation of mass, charge and spin but Ps is

incorporated into the aether structure with the effect of an oscillation of the aether.

Nothing is annihilated!

**Intensity of light according to QM erroneous...**

**Laser intensity depends on amplitude and not on the number of photon shots**

Recall the QM explanation for different intensities of emitted light: Ensembles of atoms generate myriads of photons. What then accounts for the relative intensities? The causes are allegedly the different probabilities associated with the different transitions (or quantum jumps). Therefore, if there is a large probability of a jump the result is a bright line! (What is the cause for different probabilities? Unknown...) According to QM only the number of photons causes the brightness of the light beam, whereas the frequency of

the light determines the energy of each individual photon.

So QM claims that the intensity depends on the number  $N$  of photon hits:

$$I \propto N h\nu$$

But if you have tuned a laser to a certain frequency, you can generate a more intense ray when you increase the laser power ( $W$ ). For example an argon ion laser may be tuned for a wavelength  $\lambda = 514,5 \text{ nm}$  (green).

Suppose a single line operation. Now increase the power from 1,2 to 1,7 W or more. The result is a brighter line. If the laser produces a wave then higher intensity associated with the same frequency means a wave with greater amplitude! This has nothing to do with any probability.

The concept of a photon cannot explain the amplitude dependency of the intensity.

At this point QM gets embarrassed to explain amplification of laser waves without one of the essential qualities of a wave, namely its amplitude!

## Creation of photon supernatural

The mysterious creation of photons occurs during electron leaps. The energy of the photon corresponds to the energy difference between two electron orbits.

There is neither theoretical nor empirical evidence for the famous electron leap and also for the creation (out of an energy difference) of the photon. Note that the photon in this bizarre model is necessarily chargeless, but it has spin.

A second supposed source of photons are moving charged particles like electrons in a cyclotron. In that case the electron is a photon gun. Photons are produced and emitted forward by the electron because accelerated charges produce radiation and radiation is conceived as emanation of particles. The frequency of photon shots is unknown so far! These few examples show the impossibility of quantized energy bundles (or of quanta of the EM field).

Remark: Electro optical effects like the Faraday- and the Kerr-effect are not explicable with charge-less photons.

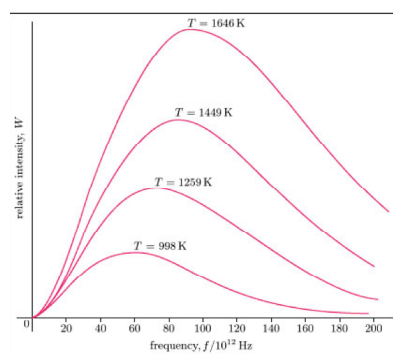
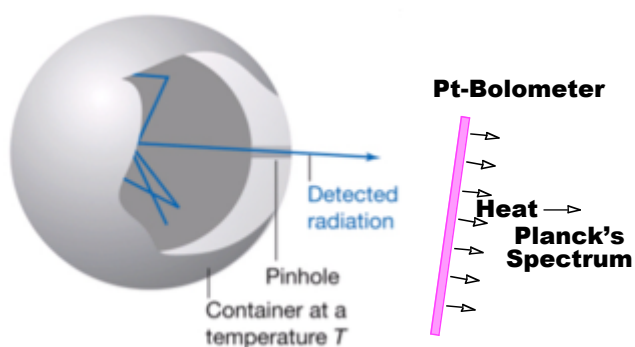
## Appendix: Langley's bolometer does not measure energy lumps $E = h\nu$

Let us see how a platinum bolometer works. Absolute astronomy.com

<http://www.absoluteastronomy.com/topics/Bolometer> summarized:

*The first bolometer used for infrared observations by Langley had a very basic design: It consisted of two platinum strips, covered with lampblack, one strip was shielded from the radiation and one exposed to it. The strips formed two branches of a Wheatstone bridge, which was fitted with a sensitive galvanometer and connected to a battery.*

*Electromagnetic radiation falling on the exposed strip would heat it, and change its resistance, the circuit thus effectively operating as a resistance temperature detector. The figure of black body cavity is from [www.chem.ncnu.edu.tw/mimi/edu/chemlife/black.htm](http://www.chem.ncnu.edu.tw/mimi/edu/chemlife/black.htm)*



We will show the impossibility of an inference from the electrical measurement of temperature by a bolometer to incident energy lumps  $E = hv$ !

Obviously there is no measurement of energy lumps  $E = hv$ . That there are such energy lumps is an impossible interpretation. The measurement says only, that the absorption of the platinum foil for a given temperature and frequency shows an asymmetric bell-shaped function. The main cause for the vibrations of platinum may be resonance processes: absorption goes on when the radiation frequency can activate the resonator mechanism. Planck assumed that *resonators* (= oscillators) in the cavity vibrate due to temperature. He did not either consider the interaction of the atomic oscillators and the medium in the cavity or the interaction of the medium and the platinum foil. For a certain temperature  $T$  the frequency dependence of intensity is measured by a bolometer. But the measurement concerns the emitted temperatures of the platinum foil and not the incoming radiation spectrum. According to Kirchhoff, Planck assumed that heat emission of the black-body and absorption of the platinum foil are identical.

Energy conservation requires only that the platinum heat emission energy equals the energy of black-body emission if the medium and the platinum metal transmits all energy. But for a given temperature, the spectra of blackbody and platinum emission must not be identical. But this is not essential for our purpose to reject the concept of a photon. It is important to note that the bolometer does not translate 1:1 the real radiation spectrum into the bolometer spectrum that we know only! It is possible and probable that the bolometer measured spectra that coincide with Planck's formula become distorted by the bolometer.

The ontological flaw in Planck's reasoning is that he treated the radiation energy of oscillators that oscillate at their discrete natural frequencies (that are *quantized*, of course) as the energy of a bombardment of energy atoms. Intensity is taken as due to multiple photon bombardment. Planck's second error is therefore that energy of radiation depends on frequency only and not in general on amplitude too.

$E = hv$  has the dimension of frequency:  $1/T$ , because a constant of nature has no

Planck's  $h$ , the outcome of curve fitting is not a constant of nature, meaning that there are energy lumps  $E = hv$ . The shape of the Planck curve is a property of the waving medium, the aether.

Planck was concerned only with the temperature curve of the platinum bolometer. He did not clarify the nature of electromagnetic radiation that interacts with the platinum foil. The platinum foil of the bolometer interacts with the incident radiation waves. Platinum absorbs radiation energy and heats up. The absorbed energy depends on frequency and amplitude of waves. The same heat intensity can be due to different frequencies and amplitudes:  $E = f(\nu, A) = f(x\nu, yA)$ , where  $x > y$ . A higher frequency is compensated by smaller amplitude. Energy lumps that have only frequency cannot explain this.

The CMB radiation was measured by a spectrophotometer that can measure the intensity as a function of the source wavelength. *Especially for infrared spectrophotometers, there are spectrophotometers that use a Fourier transform technique to acquire the spectral information quicker in a technique called Fourier Transform InfraRed.* (wikipedia → <http://en.wikipedia.org/wiki/Spectrophotometer>)

Of course, we cannot expect to measure true data. Therefore the true shape of the radiation is not exactly known.

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[http://lambda.gsfc.nasa.gov/product/cobe/about\\_firas.cfm](http://lambda.gsfc.nasa.gov/product/cobe/about_firas.cfm)

The COBE Far Infrared Absolute Spectrophotometer (FIRAS)