Theory of heat radiation and degradation of oscillators

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Abstract

Is offered neoclassical of the Planck formula construction and the degradation of oscillators resulting in to originating of relict radiation is shown.

Orthodoxes at any opportunity kicks classic physics, which one, ostensibly, is unfit to explain many phenomena, in particular, heat radiation of an ideal black body. Here I want to kick a Planck formula for emittance of a black body. This formula - favourite child of orthodoxes, as for the first time in it was utilised representation about quanta.

The formula of the Planck for radiant exitance of an ideal black body:

$$\varepsilon_{\nu,T} = \frac{2\pi\nu^2}{c^2} \cdot \frac{h\nu}{e^{\frac{h\nu}{kT}} - 1} \qquad (1).$$

From (1) we see, what $\varepsilon = 0$ at $\nu = 0$ and at $\nu \to \infty$.

From here it is possible to draw a conclusion, that the Planck formula is erratic and does not correspond to experiment. It can be seen with ones own eyes on absence of visible radiation from a body heated, for example up to 550^0C, which one seems dark brown only in darkness, though the Planck formula allows gentle radiation further in visible area. For example, the counting under the formula (1) gives a radiated power for this temperature in the field of 7000 A, $\varepsilon = 0.5156 \cdot 10^{-13}$ ergs/cm^2, and in the field of a maximum visibility 5600 A, $\varepsilon = 1.964 \cdot 10^{-16}$ ergs/cm^2. The radiated power decreases in 262 times, but also the visibility is augmented with 0.0041 up to 0.995 i.e. in 242 times (N.I. Koshkin, M.G. Shirkevich. The reference book on elementary physics. Moscow, 1962, page 169). Accordingly, is erratic the distribution of a Bose-Einstein on which one Planck formula also is grounded. The experiments demonstrate, that the heat radiation always has rather clear short-wave boundary and more vigorous photons does not beam.

Distribution function of bosons, fermions and «boltzmons» (if so) in quantum and classic statisticses it is possible to record by one expression (B.M. Yavorsky, A.A. Detlaf. The reference book on physics, «Science», Moscow, 1964, page 215):

$$\overline{n}_i = \frac{1}{e^{\frac{W_i - \mu}{kT}} + \delta} \qquad (2),$$

where: $\overline{n}_i$ - average of particles in the given condition, W_i - energy of this condition, μ - chemical potential dependent from state parameters and structure of a homogeneous system, but not dependent from its mass, k - Boltzmann constant, T - absolute temperature, $\delta = 0$ for distribution of a Maxwell-Boltzmann («boltzmons») - classic particles, $\delta = -1$ for distribution of a Bose-Einstein (bosons), $\delta = +1$ for distribution a Fermi-Dirac (fermions). From (2) it is visible, that the difference between statisticses is appreciable only at $W_i \to 0$, i.e. for a case of a zero-point energy of a particle, that in the nature does not happen. If the energy of a particle in 2-3 times exceeds a thermal energy, all particles are transformed in classic, since unit in a denominator (2) can be neglected. In chapter 23.1 is shown, that the energy is necessary for formation of a photon at given temperature:

$$h\nu = 5kT \qquad (3).$$

Thus the value δ in (2) can be neglected. Here it is necessary to mark, that the orthodoxes manage to apply statistics of fermions (Pauli's exclusion principle) even to atomic electrons, the energy which exceeds one in hundreds time a thermal energy, therefore they obey to classic statistics. Thus, at some excess of energy of bosons and fermions above a thermal energy, they lose all regalia, with which one they were awarded by orthodoxes and are transformed in customary plebeians of mechanics of a Newton. On the basis of set up it is possible to assert, that the Planck formula for heat radiation is

successful adjustment under the answer by means of mathematical manipulations not having of clear physical sense.

New physics has shown, that the photons move on a screw trajectory with equal translational and tangential velocity *C*. Therefore separate photon in a direction from a beaming body bears translational energy:

$$E = \frac{h\nu}{2} \tag{4}.$$

Then is apparent, that the radiant capacity of an ideal black body will be peer to translational energy of a photon referred to a sectional area *S* of its screw trajectory:

$$\varepsilon_\nu = \frac{h\nu}{2S} \tag{5}.$$

Sectional area of a trajectory:

$$S = \pi r^2 \tag{6},$$

where *r* - radius of a screw trajectory photon. It we shall discover from the fact of an identical angular momentum for microparticles:

$$\hbar = mcr \tag{7}$$

established by a de Broglie formula:

$$\lambda = \frac{h}{mc} \tag{8}.$$

From (6), (7) and (8) we shall discover:

$$S = \frac{\lambda^2}{4\pi} \tag{9}.$$

The formula (9) we shall express through frequency of a photon and we shall substitute in (5):

$$\varepsilon_\nu = \frac{2\pi\nu^2}{c^2} h\nu \tag{10}.$$

We have received the formula Rayleigh-Jeans for emittance of a black body, where instead of «thermal» energy of a photon there is its own energy. This formula requires an additional factor reducing a radiation energy up to zero point for vigorous photons, since the unlimited energy of a photon physically is impossible.

To receive a Planck formula from (10), it is necessary this equation to multiply on distribution of Bose-Einstein, but we it to make shall not be from following reasons. The large lack almost of all theories of a modern physics in which somehow allowed some statistical distribution of parameters is consist in «perpetuities». For example, the molecule of gas can gain infinite speed or energy, though it cannot to itself be presented as outcome of impact with other molecules. It is quite possible, that the molecule as a result of several series impacts with the neighbours has gained some exuberant energy in comparison with mean energy (such energy it can not gain at the expense of simultaneous impact with the several neighbours, since the simultaneous impact is impossible). But under the known theories this energy can in tens and hundreds time exceed mean, that is impossible. On the same official notions of Hydrogenium can step-by-step be transformed into deuterium etc. However in practice we is not observed of very vigorous «tails» of any distribution. Heated up to 550^0C the body does not release ultra-violet, x-ray and gamma rays, though basically Planck formula allows it to do. Here can object, that the calculation on a Planck formula for this case gives vanishingly small a radiation energy in short-wave range, but it not the evidence of a validity of the formula. Let us suppose is beamed one X-ray quantum for hundred years - business you see basically. Besides in heat radiation heat motion of atoms transfers them in an exited state with the subsequent radiation of photons, therefore record of a kind $e^{\frac{h\nu}{kT}}$ basically is incorrect. How many atom has received thermal energies, so much has released as a photon. By receiving some exuberant energy the atom can be saved of it by several photons, therefore their common energy $h\nu$ Is always proportional kT.

Any so-called «electromagnetic radiation» is a flow of photons. The heat radiation of a body is connected to random heat motion of atoms of this body therefore does not depend on a chemical composition. At once there is a problem on the mechanism of transfer of

atoms in an exited state with the subsequent radiation of photons of heat radiation. On notions of official physics the energy levels of atoms are inspissated far from a ground state. To throw an electron even on the second energy level it is necessary to expend energy a several electronvolt. At the same time mean energy of heat motion makes only 0.025 eV at room temperature. Therefore excitation of atoms at the expense of their heat motion is impossible from the point of view of official physics. The references to vigorous particles «of a lengthy tail» do not decide this problem since as a matter of fact «tail» short. Any statistical distribution of particles in official physics guesses presence of particles possessing, basically, infinite energy. But the nature does not tolerates zero points and infinities. If there were such particles, the spontaneous ionization of atoms would be watched, since if the particles of «tail» are capable to throw electrons on high energy levels, it is necessary to add not enough energy to ionize atom. How many we did not wait for appearance of a photon of a visible light in a radiation spectrum of a black body at room temperature, we it never awaited, though the Planck formula enables appearance of any photons. All this speaks that any distributions of particles in a modern physics are erratic. Thus, the modern physics can not sensible to explain appearance of heat radiation.

I result detailed analysis of reasons of appearance of heat radiation from the point of view of new physics. New physics considers, that the energy levels of atom are inspissated near to a ground state, therefore to transfer atom in an exited state any gentle effect on it is capable. As a result of impacts of atoms with each other they appear in a miscellaneous degree of excitation from zero point up some maximum value. This maximum value is determined by that the thermal energy of particles grows linearly with temperature, and the energy indispensable for throw of an electron on more a high level grows in quadratic relation. Therefore at given temperature there is such energy level on which one it is impossible to throw an electron by means of a thermal energy. It determines maximum energy of photons of heat radiation.

Let's consider an extreme case of maximum excitation of atoms. Let's presume, that two identical atoms with identical energy have tested head-on impact. Apparently, that after that they «will stay». Where their kinetic energy has got to? It is clear, that it has spended on excitation of these atoms. And it is optional was arranged only on two equal parts. Energy can bodily proceed to one of them. It depends on a mutual disposition of outside electrons at the moment of impact.

On the Arrhenius, the concentration excited atom *C* is peer:

$$C = C_0 e^{-\frac{E}{kT}} \tag{11},$$

where: C_0 - common concentration of atoms, E - activation energy of process of excitation of atom.

Apparently, that the activation energy of excitation of atom in accuracy is peer to energy of a photon (photons) radiated behind excitation, since the atoms receive or return excitation by strictly definite portions.

$$E = h\nu \tag{12}.$$

Let's substitute (12) in (11):

$$C = C_0 e^{-\frac{h\nu}{kT}} \tag{13}.$$

The emission intensity will be directly proportional concentration excited atom and is inversely proportional concentration of nonexcited atoms:

$$\varepsilon = K \frac{C_0}{C_0 - C} \tag{14},$$

where: K - proportion factor equal (10).

By substituting (13) in (14), after some transformations we shall receive:

$$\varepsilon = \frac{K}{e^{\frac{h\nu}{kT}} - 1} \tag{15}.$$

By substituting (15) in (10) we shall receive the formula in accuracy coincident with a Planck formula (1), but having absolutely other sense. This example once again confirms a surprising phenomenon in science, when from opposite initial hypotheses it is possible to receive the same outcome. Simultaneously it once again demonstrates, that the obtaining of outcome, affirmed experiments, is not endorsement of rightness of initial hypotheses.

Degradation of oscillators.

Let's consider an insulated system in which one placed body with temperature *T*.

It is represented apparent, that at given temperature there will be practically one oscillator, which one has gained maximum energy. What will happen with this energy? Two paths with identical outcome here are possible. The oscillator in 10^{-8} seconds or at once will radiate a photon with this energy and will transmit to its neighbours. Or is more likely, that it will exchange energy on a several more long-wave photons as a result of a successive transition on the ground level. That most will make also any of its neighbours received such vigorous photon. As a result of a similar degradation of an oscillator its maximum energy will be scattered. That expects and following oscillator acquired maximum energy etc. As a result of a degradation of oscillators the system will be stuffed by photons possessing all time by decreasing energy, and the maximum energy of the most vigorous oscillator also step-by-step will decrease. The process of a degradation is possible to compare with bursting of bubbles of the decreasing sizes through everyone 10^{-8} seconds. Ultimately temperature of a body will become to close absolute zero of temperature, and space of an insulated system will be filled by «relict» photons. In this sense «thermal death» by the Universe, as insulated system (so thinks new physics) as a result of equalization of temperatures of its members there is no in any a matching with described «absolute thermal death» the Universe. But the below mentioned calculations demonstrate, that the similar horror does not threaten to us. The Universe long before «absolute thermal death» will finish the next cycle of oscillations and all will begin anew. It is interesting to count up, how many time is necessary to wait for «absolute thermal death» of a heated body of mass 1 mol matters? In this mass is contained $6.02 \cdot 10^{23}$ potential oscillators. Provided that each of them loses the energy in 10^{-8} seconds, all energy they will lose for $6.02 \cdot 10^{15}$ seconds or 191 million years. Therefore alone, while, evidence of a degradation of oscillators the relict radiation of space is.

References:

http://www.new-physics.narod.ru