

8 The harmonious game with integers by a proton and an electron

The whole-numbered ratio's, found in the preceding paragraph as a consequence of ec-pulsation, can also be seen with other parameters which influence the proton-electron system.

In § 6.3.2 we found that a finite number of conjunction types exist, produced by the proton ec's, namely $n_r = 2.1036 \times 10^7$. If all types of conjunctions have passed, the proton structure has to repeat itself with respect to that phenomenon.

It shows to be possible to determine **the period of repetition t_r** of the proton. The possibilities of conjunction of the ec's has been handled as ec-volumes, which are filled successively by the moving ec's. The mutual velocity of the ec's in protons is already known, namely $V_p = 0.7399 c$. The distance between the ec-volumes may be put on $2r_e$, though corrected with the factor for most efficient ec-packing $k_{am} = 0.97261$, which has been met before already (§ 5.4.2). If we assume that the time, necessary to cover the row of ec-volumes with velocity V_p , is equal to the period of repetition, we can calculate that period:

$$t_r = \frac{n_r \cdot 2r_e \cdot k_{am}}{V_p} = \frac{(2.1036 \times 10^7) \cdot 2 \cdot (6.6979 \times 10^{-18}) \cdot (0.97261)}{(0.7399) \cdot (2.997925 \times 10^8)}$$

hence $t_r = 1.2356 \times 10^{-18} \text{ s}$

The orbiting period of the electron, in an H -atom in lowest state of energy, is equal to:

$$t_s = 2 \cdot \pi \cdot r_H / v_e = 1.51982 \times 10^{-16} \text{ s, see § 5.1.}$$

It is astonishing to see that the ratio between t_r and t_s becomes an integer:

$$\frac{t_s}{t_r} = \frac{1.51982 \times 10^{-16}}{1.2356 \times 10^{-18}} = \mathbf{123.00}$$

This means, that during one orbit of the electron in an H -atom in lowest state of energy, each type of inside conjunction could pass exactly 123 times, into arbitrary directions. Of course, the effective number of conjunctions must be lower for the orbiting electron, because of its distance. To estimate the number of identical specific conjunctions, which can be felt by the electron during one minor orbit, two ways can be followed:

- Calculation of the ratio between the area of the surface and the area of a small strip, $2r_e$ wide, along the equator, from the small spheres with radius $a_{mp}/2$, used to estimate the total number of specific conjunctions n_r , or:
- Calculation of the number of conjunction types, per ec-volume of the proton, per ec-

pair; then multiplication by the conjunction possibilities of the ec-pair in the a_{mp} -sphere:

$$\frac{4\pi \cdot (a_{mp}/2)^2}{2\pi \cdot (a_{mp}/2) 2r_e} = \frac{a_{mp}}{2r_e} = 5.033;$$

$$n_r \times \left(\frac{r_e^3}{r_p^3} \right) \times \left(\frac{1}{n_p/2} \right) \times \left\{ \frac{4\pi \cdot (a_{mp}/2)^2}{\pi r_e^2} \right\} = 5.0656$$

It appears to be convenient (see below) to adopt a value near the average of both values, i.e. **5.048**.

The number of identical specific conjunctions, observable from all directions during the orbital period t_s may be found from:

$$n'_c = (t_s/t_r) \times K_c = 123 \times 0.0821 = 10.0983,$$

where K_c = probability of specific conjunctions in protons (see § 6.3.2).

Thus, observed in one plane, the number of identical specific conjunctions can be described by:

$$n_c = (t_s/t_r) \times (K_c/5.048) = 2.000$$

This signifies that two groups, each of it consisting of mutual different conjunctions, can be indicated. For the orbiting electron the number of observed conjunctions in each group will be reduced by the *factor of observability* $f_{ob} = 2r_p/r_H$. This factor is inversely proportionate to the distance, if conjunctions within one plane are concerned. Now the **effective number of conjunctions per minor orbit** can be calculated:

$$n_{co} = n_r \times 123 \times (K_c/5.048) \times (2r_p/r_H) = 818.0$$

By using the factor n_r (see § 6.3.2) the permanently realisable conjunctions are reproduced. As it concerns an even integer, each **effective group** consists of a whole number of conjunctions:

$$n_{cg} = 409.0$$

It will be shown that this number is **constant for all higher circular orbits**.

As K_c says nothing about the sign of the conjunctions, the signs of each group are mixed, so that one can say that the two groups together contain positive- as well as the negative possibilities of conjunction:

In a hydrogen atom in lowest state of energy, each orbit of the electron embraces two effective groups of specific conjunctions. Each group exists of mutual different conjunctions in the proton, which will averagely be repeated in the next orbits.

8.1. The relation between the energon hypothesis and quantum mechanics.

When a positive ec is hiding behind a negative one, the attracting force, exerted by the proton on the electron, is decreased during a very short period of time, which causes a domination of the centrifugal force. The reverse of that conjunction causes increasing of the attracting force during the period of conjunction. Considering the harmonious character of the ec -motion inside the proton, it seems plausible that the different types of conjunction will alternate in a harmonious way, causing a regular wave in the orbit of the electron.

The harmonious interaction of forces inside matter suggests, that the main characteristics of the proposed model of nucleons seem to be the role, played by the rotation, pulsation and conjunction of the ec ,s. On one hand, the phenomenon of conjunction together with spin is supposed to be the base of gravity. On the other hand conjunction together with pulsation is thought to rule the distinct levels of atomic energy (§ 7.2 /b). This results in the exchange of energy in the form of quanta.

The way, which is in principle leading to quantum mechanics, may be shown with the use of the simplified model of the hydrogen atom.

The average radius of this H -atom in lowest state of energy measures:

$$r_H = \frac{\varepsilon_0 \cdot h^2 \cdot n^2}{\pi \cdot m_e \cdot e^2} = 5.29176 \times 10^{-11} m \quad (\text{if } n = 1)$$

whereas the average velocity of the orbiting electron is given by:

$$v_e = \frac{e^2}{2 \cdot \varepsilon_0 \cdot h} = 2.18769 \times 10^6 m \cdot s^{-1}$$

The fine structure constant may be derived from:

$$\alpha = \frac{e^2}{2 \cdot \varepsilon_0 \cdot h \cdot c} = \frac{v_e}{c} = 7.29734 \times 10^{-3}$$

which indicates, that this constant is connected with the ratio of the ec -velocity in the lowest orbit and the velocity of light.

The reverse of the constant measures: **$1/\alpha = c/v_e = 137.036$**

It is possible to calculate the maximal number of subsequent interactions between the proton and the orbiting electron. According to the classical conception, this number can be found from division of the orbital period by the period, needed to cover the atom radius with the speed of light:

$$N'_{ww} = (2 \cdot \pi \cdot r_H / v_e) \times (c / r_H) = 2 \cdot \pi \cdot c / v_e = 2 \cdot \pi / \alpha = 861.023$$

However, this number has to be corrected according to the relativistic conception,

which makes an integer of it:

$$N_{ww} = \frac{2 \cdot \pi \cdot c}{v_e} \cdot \sqrt{1 - (v_e / c)^2} = \mathbf{861.000}$$

From the ratio $t_s/t_r = 123.00$, and from the value N_{ww} , the maximal number of interactions in one period of repetition may be derived:

$$N_r = \frac{t_r}{t_s} \times N_{ww} = \frac{861.000}{123.000} = \mathbf{7.000}$$

As already has been shown, the number of identical groups of specific conjunctions per minor orbital period forms also an integer:

$$n_c = \mathbf{2.000}$$

just as do the total numbers of effective conjunctions per orbit, as well as per effective group: $n_{co} = \mathbf{818.0}$ and $n_{cg} = \mathbf{409.0}$, respectively.

The number of periods of pp -convergence in that orbit, which may be derived from N_{ww} conform *figure 11* for rest- or slow motion situations, is also an even integer:

$$N_{\Delta t} = 2/3 \times 861.000 = \mathbf{574.000}$$
, as is $N_{\Delta t} / N_r : \mathbf{82}$.

Nuclear systems, ruling the movement of the orbital electron(s), can only vary according to a complex of integers, which allows the maintenance of an in itself returning wave pattern in the orbit(s).

It appears impossible to multiply the radius of the atomic system by an arbitrary number, without breaking the harmony of integers of the other qualities. If the radius is multiplied by a factor x , the orbit must also be extended by that factor. And because $r_H = e^2 \cdot n^2 / (4 \cdot \pi \cdot \epsilon_0 \cdot m_e \cdot v_e^2)$ the orbital velocity must be multiplied by a factor $1/\sqrt{x}$ (or \sqrt{x}/x). The following factors appear, with respect to some other parameters:

- the orbital period $t_s' = t_s \cdot x \cdot \sqrt{x}$ (from $x \cdot x/\sqrt{x}$)
- the factor of observability $f_{ob}' = f_{ob} / x$, (from $2r_p/(r_H \cdot x)$, see §8)
- the number of effective groups of conjunctions $n_c' = n_c \cdot \sqrt{x}$ (from $x\sqrt{x}/x$).
- the number of conjunctions per effective group is equal for each circular orbit, namely $n_{cg} = \mathbf{409}$, because the orbiting period increases with $x\sqrt{x}$, the factor of observability decreases with $1/x$ and the number of effective groups increases with \sqrt{x} , thus $(x\sqrt{x}) \times (1/x) \times 1/\sqrt{x} = \mathbf{1}$.

In order to maintain the integer values, x has to possess the value n^2 , n being an integer. This is expressed in physics by the main quantum number n (see the equation for r_H , given earlier). Note that n_c' is always even, because the value of n_c equals $\mathbf{2}$.

As the number of effective groups of conjunctions per orbit (L_0/λ) grows with n ($=\sqrt{x}$),

and the length of the orbit L_o grows with n^2 , the wavelength λ (one set of effective conjunctions) has to grow with n .

Using this knowledge, the relation between the energy and the wavelength of the system can be described by the following equation:

$$E - V = \frac{e^2}{8 \cdot \pi \cdot \varepsilon_0 \cdot (r_H \cdot n^2)} = \frac{K}{(\lambda \cdot n)^2}; \quad E = \frac{K}{(\lambda \cdot n)^2} + V$$

The energy $E = m_e \cdot v^2$, be found in § 3.5.2 for a rotating system of single ec's, has now been replaced by the kinetic energy $E_k = \frac{1}{2} \cdot m_e \cdot v^2$ for the ec, orbiting around a heavy nucleus, thus possessing all the kinetic energy. In this situation Planck's constant offers the opportunity to read the equation as the product of velocity and momentum:

$$E = \frac{1}{2} \times \frac{h}{m_e \cdot (\lambda \cdot n)} \times \frac{h}{(\lambda \cdot n)} + V = \frac{h^2}{2 \cdot m_e \cdot \lambda^2} + V, \quad \text{if } n=1.$$

Thus, from the first equation may be said: $K = h^2 / (2 \cdot m_e) \text{ kg} \cdot \text{m}^4 \cdot \text{s}^{-2}$

This formula is equal to that, which can be derived from the known equations from *Planck, Einstein* and *de Broglie* :

$$E - V = \frac{m_e \cdot v^2}{2} = \frac{p^2}{2 \cdot m_e}; \quad p = \frac{E}{c} = \frac{h \cdot \nu}{c} = \frac{h}{\lambda}; \quad E = \frac{h^2}{2 \cdot m_e \cdot \lambda^2} + V$$

where $p = m_e \cdot v = \text{ec-momentum}$, $\nu = \text{frequency}$ and $V = \text{resting potential energy}$.

Stating that the integrity of n in the first approach is ruled by the phenomenon of ec-conjunction in the nucleus, we have found a connection between the energon hypothesis and quantum mechanics, because the most simple one-dimensional equation in quantum-mechanics has been derived from the above formula:

$$-\frac{h}{2 \cdot \pi \cdot i} \cdot \frac{\delta \varphi}{\delta t} = -\frac{h^2}{8 \cdot \pi^2 \cdot m} \cdot \frac{\delta^2 \varphi}{\delta x^2} + V \cdot \varphi \quad (\text{Schrödinger-equation})$$

where φ depicts a wave function, and $i = \sqrt{-1}$.

It is important to note, that all micro-physical measurements are based upon the interaction between elementary particles and atomic structures, thus, in the vision of the energon hypothesis, being subject to events of ec-conjunction.

An other item is, that empty space does not exist in experiments. Material systems, consisting of dynamic configurations of the two kinds of ec's, throw immense quantities of energons into the surrounding space, inevitably reacting with other ec-systems.

That may be the reason why Einstein's Space around a mass can be considered as

being curved: it is not an empty space, but a space that is filled up with fast moving energons, thus being a physical entity to which physical properties can be ascribed. In the next chapter we will see that the potential power of the physical space must be immense.

It may also be the reason why an elementary particle has a chance to react with waves of energons, coming from the surrounding material structures. According to this vision, for instance, a fixed material structure creates a surrounding field of force, composed of complex patterns of *pp*-waves, being connected to the harmonious waves of the composing *ec*'s itself. Each particle of matter is able to react with those patterns of *pp*-waves. Interfering *pp*-waves, caused by the edges of two splits in the material structure (wall, crystal), may assort particles, coming through these splits, into specific directions, just as though these particles were interfering waves itself! Considered in this way, it seems plausible that interference can also be shown if the particles enter one by one through the splits and are made visible on a sensible screen, thus answering a 'hot' question in quantum mechanics.

In my opinion some of the rather mysterious conclusions of the 'Kopenhagen's interpretation' must be considered with reserve. That is the case, for instance, with the statement about 'complementary' properties of separated particles. These properties should just emerge at the moment of measurement at one of the partners, independently of the distance.

In spite of the rather indirect demonstration (Aspect), based upon a mathematical theory (Bell), the last words will not have been spoken in this Einstein-Podolsky-Rosen problem, because one important aspect is still failing: the direct causal connection between the considered phenomena. Only such a causal and logic connection, described in a comprehensive theory, will be convincing. *)

8.2. The concept of quarks inside nucleons

By shooting electrons with high velocity into nucleons and measuring the angles of the recoiled or transmitted *ec*'s, three points of condensation have been found inside the nucleons. These 'particles' are called **quarks**. According to the *QCD*-theory, these quarks must bear a partial, elementary charge:

A **neutron** spans two 'down' (*d*) quarks and one 'up' (*u*) quark, with charges $-1/3$, $-1/3$ and $+2/3$ respectively, and no total charge.

A **proton** has two *u*-quarks ($+2/3$) and one *d*-quark ($-1/3$), having a total charge of $+1$.

Trying to combine these facts with the proposed model of nucleons, believed to be the dynamic configurations of a large number of the two elementary charges, a partial charge of an area inside a nucleon has to be conceived as being an area through which a different number of positrons and electrons pass within a distinct period of time. An average charge of $+2/3$ can be explained by the passage of 5 positive *ec*'s and 1 negative *ec*, which makes

$$(5-1)/6 = +2/3$$

A ratio of 2 positrons and 4 electrons leads to an average charge of

$$(2-4)/6 = -1/3.$$

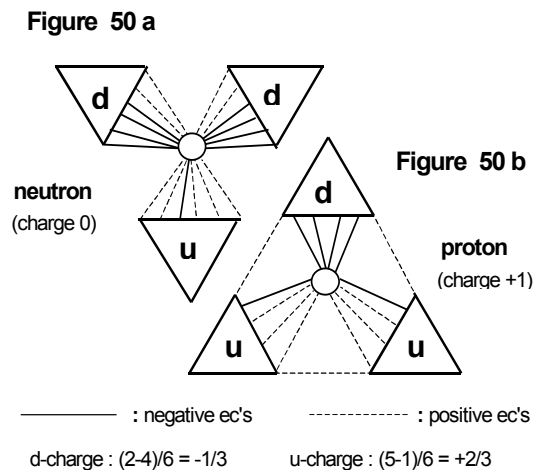
This vision has schematically been pictured for neutrons as well as for protons in the **figures 50 a** and **50 b**, respectively. The three quarks are indicated by triangles. The relative numbers of *ec*-passages through the quarks per period t_q are pictured by dotted lines for positrons and by normal lines for electrons.

As can be seen, the conditions for partial charges are fulfilled.

This way of presentation make it necessary to accept the idea that in protons the quarks mutually exchange positrons besides the transmission of *ec*'s, coming from the rest of the nucleon. Admittedly, this vision does not answer the question why quarks exist in the, undoubtedly very complicated, nucleonic structure. Three

remarks can still be made in addition to the above developed vision:

- As *ec*'s possess a second property besides charge, namely spin, quarks too must be distinguishable in other ways than by charge, what has proved to be true.
- The three regions of quarks always lie in one plane, allowing a spatial spin-orientation of the nucleon.
- It is thinkable that the same *ec*-power that forces nucleons into the dynamic quark-structure, will resist a trial to enlarge or change the distances between the quarks.



*) see: K.Hess and W.Philipp; PNAS, 4 December 2001