10. The transmission of *EM*-signals by energon waves

As has been stated before, logical arguments forbid that photons can be understood as moving things (see Introduction). On the contrary, the energon hypothesis shows, that photons can only 'exist' at the moment of absorption by the receiving material structure. With this absorption is meant the resonance of the receiving system with the waves of *pp's*, emitted by changing systems and converging into the receiving system. The large spread in velocity (c±V±vg) of *pp's*, emitted by *ec's* and diverging into space, makes it possible that *pp's*, which are created at different moments in one region, can **converge** into one point somewhere in space, but it makes it also possible that *pp's*, which are simultaneously emitted in more than one region, can converge into that point too. An *ec*, situated in that point, is able to react with those *pp's*.

These items from the energon hypothesis allow to reconstruct the emission of *pp*-signals as well as their absorption. How the events may be conceived more detailed, is intended to be explained in the next paragraphs.

10.1. The exchange of *pp*-signals at a rest-situation

Systems, which are able to emit *pp*-signals, are coherent systems of charges, mostly atoms. When a hydrogen atom, for instance, changes from one level of energy into a lower level, a signal is emitted. However, no signal is produced if the atom does not change its energy, though the energon hypothesis tells us that still *pp*-waves must be expelled into the surrounding space.

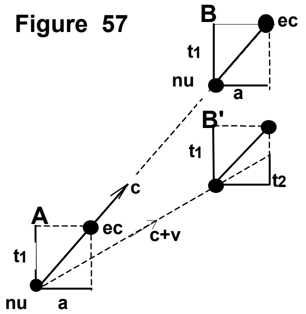
This problem can be solved if one realises that a **signal** must change something in the receiving system, otherwise it is no signal at all, and that this change must be an **energetic event**, because only a force can change something in a material system. The energetic level of an atom happens to be an equilibrium between two parts of the system: the ruling nucleons and the orbiting electrons. Between the two parts, exchange of information (signals too) happens with the speed of light (§ 3.1 and § 3.4)

The change in an atom will be executed according to the following path:

- the ruling nucleon sends a signal of change to the orbiting electron,
- the electron changes its orbit,
-the data of the new orbit, signalled to the nucleon, must be brought into accordance with the new rules for equilibrium inside the nucleon.

Thus, the **communication with the velocity of light,** between the two parts of the system, belongs to the potential signal, consisting of *pp*-waves. Reversed, if the same signal will be absorbed, an equal path in time has to be followed, which means that the information for the orbiting electron and the information for the nucleon must be separated by the period of time, needed for the communication between the two parts.

Figure 57



The fact that only similar systems can exchange a signal, exclusively with the speed of light, may be better understood if the event is schematically pictured, as is done in **figure 57**.

As can be seen, the emitting system *A*, with a distance *a* between nucleon and electron, and the similar system *B*, both use equal velocity (*c*) for the inside communication and for the exchange of the signal. The transport of the signal through *B*, and the inside communication in that system, both take therefore equal periods of time (t_1): the signal fits on system *B*. 'Signals' with differing velocity do not fit on that system (*B'*), because the period of inside communication and the period of signal transport will be different (t_1 versus t_2).

The emission of a potential signal must happen into a **specific direction**.

In § 3.2 we have seen that the forces, working between moving *ec's*, depend on the relative velocity. If an *ec* makes a short movement, the *pp*-beam, emitted along the direction of the *ec*-track, shows a period of *pp* -condensation (independent of the sign of the velocity). The *pp*-beam, emitted perpendicularly to the *ec*-movement, shows a distortion of the axes of rotation, besides *pp*-condensation. The **figures 58 a** and **58 b** depict schematically the idea of ***pp*-condensation and *pp*-distortion**. The effect of relative movement is, in the first case, the exertion of an extra force along the connecting line, and, in the second case, the exertion of a force component perpendicularly to that line.

Figure 58 a

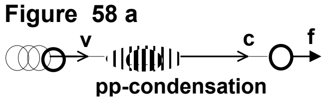
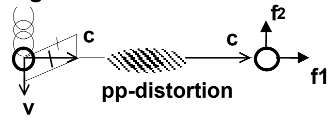


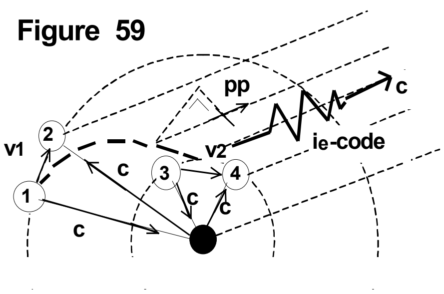
Figure 58 b



In practice, the ***pp*-coding** of the change of energy level in an atom must be very complicated. As the nucleus and the orbiting electron both play a fundamental role, it seems evident that the potential *pp*-codes have to move within the extended plane through the nucleus and the orbit, and will show a transversal wave pattern. Indeed, the phenomenon of light polarisation pleads in advance of this vision. The direction of the potential *pp*-code, most probably is that one, which favours *pp*-distortion, see **figure 59**. That beam codes for the difference between the two orbits and for the period of communication (with light velocity) between the partners in both situations.

To become effective, the potential signal has to cope with the demand of ***pp*-density of the signal**, at the moment of absorption. The density of the *pp* -code is diminishing very fast, because the *pp's* diverge from the point of emission. The absorption of the energy quantum, needed for a specific electron jump in the receiving system, is only possible if many equal *pp*-codes can act simultaneously, which means that a **convergence of codes** into the absorbing system is necessary. This demands an almost synchronous emission of the codes into the same direction by equally situated atoms. The barrier of this condition seems to be higher than it really is. Even a small quantity of radiating matter, for instance one milligram, contains thousand million times thousand million atoms, so that synchronous radiation by equally situated atoms must occur very often. However, a one hundred percent synchronisation of the action is unthinkable. Though very small, the receiving atoms must allow some variation in time and length. With other words the atoms must show some **tolerance for signals**.

Figure 59



Before the attempt can be made to describe the photon action more accurately, it is necessary to give a definition of the conceptions, needed for this description:

Identical codes of emission (***i_e*-codes**): equal *pp*-codes, emitted by identical atoms within the same period of time (t_e).

Period of emission (**t_e**): period for the emission of potential *i* -codes [T].

Code of induction (***i*-code** or **photon**): the converging i_e-codes, being able to bring an atom simultaneously to resonance, leading to the reverse of the i_e-code emission.

Length of resonance (λ_i): wave length of the *i*-code [L].

Tolerance of velocity (**v_q**): the variation, allowed for *c* [LT^{-1}].

The period of resonance (**t_{rs}**): the period for the induction of a photon [T]

Tolerance of resonance (**t_{qr}**): the variation, allowed for t_{rs} [T].

Angle of convergence (ω_i): the angle within which i_e-codes are allowed to converge into an *i*-code [radians].

Chain of induction (**l_i**): length of the chain of atoms in a source, which may form a specific *i*-code [L].

Normal *pp*-intensity of i_e-codes (***N_s***): number of *pp*'s, belonging to a specific i_e-code, expressed per unit of time $[T^{-1}]$.

Normal i_e-intensity (***N_U***): number of specific i_e-codes, emitted by atoms on a source per unit of length and per unit of time, being able to induce one specific photon in the unit of area at the unit of distance $[L^{-1}.T^{-1}]$.

When a group of emitters sends synchronously i_e-codes, with velocity $c \pm v_q$, into the direction of a specific area at distance *A*, the units will arrive within the period of time :

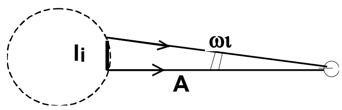
$$\frac{A}{c-v_q}-\frac{A}{c+v_q}=A\cdot\left(\frac{c+v_q-c+v_q}{c^2-v_q{}^2}\right)\approx 2.A\cdot\frac{v_q}{c^2}$$

This means that the i_e-codes, converging within the very short period of time t_{qr} have been emitted over the period:

$\mathbf{t_e \approx 2.A.v_q / c^2}$ s.

The chain of induction, be found in one plane through the receiver, is determined by the distance *A* to the receiver and by the *angle of convergence,* see **figure 60**:

Figure 60



$\mathbf{l_i = A.tg(\omega_i) \approx A.\omega_i}$ m (ω_i in radians)

The number of i_e-codes, that the *chain of induction* with normal intensity has to emit to induce a specific photon at a distance *A,* measures:

$\mathbf{N_{ie} = N_u.l_i.t_e = N_u.A.\omega_i.2.A.v_q / c^2 = 2.N_u.\omega_i.v_q.A^2 / c^2}$ [..]

The chain of induction and the period of emission both have to grow with distance *A*.

At distance *A*, the flux of *pp*'s per specific i_e-code will be:

$\mathbf{n_{pp} = N_s /(4.\pi.\ A^2)}$ $m^{-2}.s^{-1}$

Thus the flux of *pp*'s per specific photon must be constant:

$\mathbf{n_{ppi} = n_{pp}.N_{ie} = 2.N_u.\omega_i.v_q.A^2.N_s / (4.\pi.A^2.c^2)}$

$\mathbf{= 2.N_s.N_u.\omega_i.v_q/(4.\pi.c^2)}$ $m^{-2}.s^{-1}$

Note that no photons could be active without the tolerances ω_i and v_q .

Each specific photon is caused by a specific number of pp's, working at ***any*** *distance from the right chain of induction .*

The *chain of induction* on the source of radiation may point into each direction. Suppose, *R is* the radius of a disk-like source. Then the number of specific l_i 's into all directions is:

$\mathbf{N_l = \pi.(R / l_i)^2}$ **, or** $\mathbf{N_l = \pi.R^2 / (\omega_i^2.A^2)}$

Thus this number is inversely proportionate to A^2.

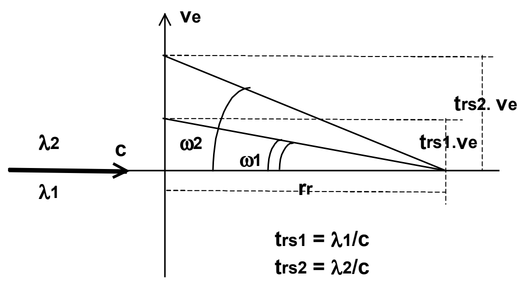
Though each specific photon remains its energy (amount of pp's) independently of the distance to its source, the number of photons, which can be induced by the source, is inversely proportionate to its distance, just as is found in experiments.

Of course, one source of emission can differ from the other. For instance, the intensity of the radiation can vary with the temperature. This means that, at high intensity, the number of i_e-codes per chain of atoms will be larger, which causes a bigger chance on photon activity at equal distances.
The length of l_i , and with that the value of ω_i , both belong to a specific *i*-code, thus being determined by the resonant structure.

Photons with higher energy, thus with shorter wavelengths, are related to smaller l_i - and ω_i - values.

This may be due to the period of resonance t_{rs}.
In **figure 61** can be seen that with equal electron velocities (v_e) and equal dimensions for resonance (r_r), the different periods of resonance (t_{rs1} and t_{rs2}) shape different angles of convergence (ω_1 and ω_2, respectively.). Though the reality is more complex, because v_e and r_r both are not real constants, the figure does show the principle of the relation between λ and ω.

Figure 61



This principle is important. It causes a sharper image of the source with shorter wavelengths (smaller l_i-values) and the deflection on material edges of light beams with shorter wavelengths will be smaller than the deflection of long-wave beams, as is shown in § 10.2.3.

10.2. Reproduction of *pp*-codes in matter.

There are diverse types of interaction possible between i_e-codes and large quantities of matter. Characteristic for these types is the reproduction of the codes by the atoms.

With the interactions, *reflection, transmission,* and *deflection* may happen, while at transmission *refraction* occurs. The conception of diverging emission of i_e-codes from an energetic event, and the in-phase convergence of identical codes into photons, both will appear very useful for understanding the mechanisms of the above mentioned phenomena.

It can be imagined that the orbiting electrons in the atoms, on a flat surface of a medium, can occupy two opposite situations with respect to the incident, converging i_e-codes, namely, one facing the incoming ray's, thus situated between nucleus and *pp*-source, and one at the other side of the nucleus, pointing downwards into the medium. How strong the resonance in both situations may be, depends on the character of the electromagnetic binding between the atom shells. At complex binding, only the upside situation will be used for resonance, causing *reflection*. With more simple bindings, the downward situation can come into action too, causing *transmission* as well.

As we will see later on, *deflection* may be a particular kind of resonance, caused by the transversal transport of i_e-codes during a transmission-like event in atoms, situated on edges.

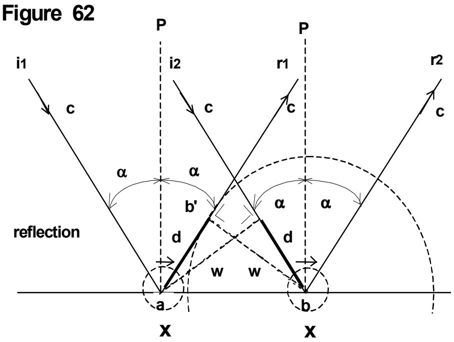
Respectively three kinds of resonance will be demonstrated by means of figures in which the situations are depicted schematically. The explanation appears to be very similar to those, already known.

10.2.1. *Reflection*

This phenomenon is depicted in **figure 62**.

As may be deduced from the very detailed imaging power of light, the angle of convergence must be very small. For instance, the tangent of the angle between two ray's with equal wavelengths, 5×10^{-4}, indicates an angle of 0.028^0, if the distance between neighbour atoms, on the reflecting surface, is thought to be 0.2 mμ, and the wavelength of the incident i_e-codes measures 400 mμ (visible light). To understand the behaviour of reflected light it is necessary, therefore, to consider very narrow in-phase beams of radiation,

Figure 62



thus with practically parallel ray's, which preferably should be monochromatic.

In the figure, the width of the incident beam is indicated by line *w* , and the angle of the beam with the normal (line *p*, erected perpendicularly to the surface) by α. The two ray's i_1 and i_2, limiting the beam and being in-phase, reach the surface in the atoms *a* and *b*, respectively. The line *w*, perpendicular to the *pp*-beam, indicates the phase of the wave at the moment that the beam reaches *a*. The opposite side of the beam (i_2) still has to go the distance *d* to atom *b*, with the velocity of light. When the atom *a* is hit by the radiation, it starts resonance with the radiation and emits *pp*-codes into diverging directions. In this case, it is supposed that only the 'upside' possibility of resonance can be used, leading to reflection only. The reflecting ability of the atoms is symbolised by the upper arrow near the dotted circle, the transmitting ability, excluded by tight atom bindings, is indicated by a cross near the lower part of that circle.

The figure shows, that the reflected ray's r_1 and r_2, moving with light-velocity, can only stay in phase if r_1 touches *b'*, on a circle with radius *w* around *b*, at the moment that i_2 touches *b*. This means that radius *b'b* is equal to *w* and is perpendicular to r_1 and r_2. The distance *ab'* is equal to *d* and indicates that the ray's, r_1 and r_2, are in phase and have angles with the normal, equal to those of i_1 and i_2. Reflections into different directions, with a shift of one or more λ-units, are excluded, because the wavelength λ is very much longer than the width *w* of the beam.

The phenomenon *polarisation of light*, emerging at reflection from a smooth surface if the angle α with the normal becomes wider, must be due to the preference of the resonance to electrons, orbiting more or less parallel to the surface.

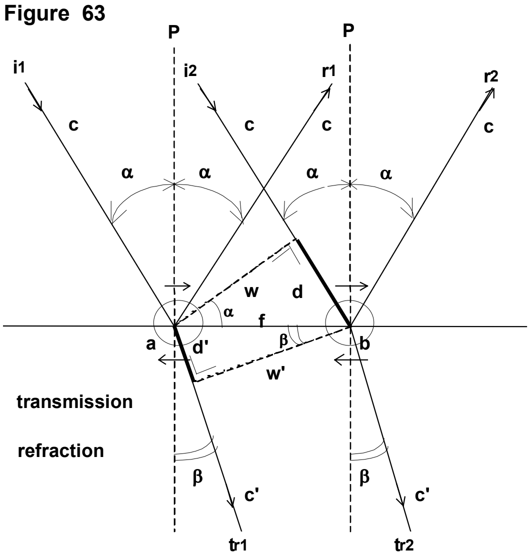
10.2.2. *Refraction*

In **figure 63** the phenomena of *transmission* and *refraction* are depicted.

A narrow incident beam of light is not only reflected, but also bent from its original direction at transmission, if a more simple atom binding in the medium allows transmission (indicated by a second arrow in the dotted circle), on the condition that the ray's make an acute angle with the normal. This phenomenon is known as *refraction*.

The explanation is quite similar to that of reflection, but the decrease of the velocity of light in the medium will have special consequences. From the points *a* and *b*, the transmission of *pp*-codes happens by resonance of numerous atoms into diverging directions. This will take some time, causing a slow down of the velocity of the potential signals to some extent (*c'*). The difference in arriving time of the ray's i_1 and i_2 of the

Figure 63



incident *pp*-beam, measuring *d/c*, must be equal to the difference in starting time for transmission *d'/c'*.

In this case, the line from *a*, touching a circle with radius *w'* around *b*, determines the direction of photon activity, namely the direction perpendicular to *w'*, which indicates an equal phase of the i_e-code radiation. The wavelength λ, again, must be thought to be much longer than the width of the beam (*w'*, determined by the angle of convergence ω_1), which excludes shifts of one or more λ-unit into other directions.

The ratio between the angles with the normal, before and after the passage of the surface, is well known and is called the *index of refraction*, for which the *Law of Snellius* is valid :

$$\mathbf{n = \sin(\alpha) / \sin(\beta)}$$

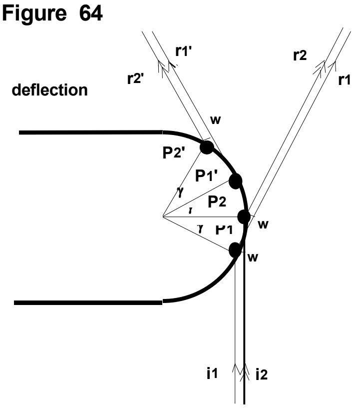
From the figure it may be deduced that:

$$n = (d/f) / (d'/f) = d / d' = c / c' ,$$

Which means, that *n* equals the ratio between the velocities of the i_e-codes before and after refraction. As always, all paths of light may be reversed.

10.2.3. *Deflection*

Figure 64



This phenomenon could be called the *edge-effect* on passing waves and is depicted in **figure 64**.

To understand what is happening with *deflection*, it is necessary to realise that the ray's in a narrow beam of radiation are not only reflected, but are also transported by the atoms along the bend surface of the edge. The equal-phase situation at ***w*** in point $\boldsymbol{P_1}$ is restored in point $\boldsymbol{P_2}$ for the reflected ray's $\boldsymbol{r_1}$ and $\boldsymbol{r_2}$. However, the restoration of the equal-phase situation is also possible, if the two ray's are transported along the edge surface over *equal distances*, and then are radiated again. This is indicated for points P_1' and P_2' : there must be an equal phase in ***w*** at point P_2'. A spectrum of other possibilities lies between the two situations which are depicted. The transport of radiation along a non-transparent surface must be possible because the neighbour atoms on the surface are 'in sight' of each other. In § 10.1 we saw that the *angle of convergence* of short-wave beams is smaller than that of long-wave beams. This means that the beams, needed for induction of photons, must be wider for long-wave beams. From the figure it may be concluded that, with wider beams, the utmost angle between the deflected beams must also be wider, because the distances between the points ***P*** are larger. The experiences confirm this reasoning.

The alteration of the direction of waves is met with all types of waves, interacting with the edges of solid barriers. It occurs with waves of sound, skimming the edge of a wall, as well as with electromagnetic waves, and even with 'waves of matter', interacting with edge-like structures.

> *All those types of deflections may be due to the transversal transport of the respective forces along the edge of a solid barrier.*

The Fraunhofer deflection, observable as a pattern of light and dark zones at both sides of the central image of a split, is due to interference, caused by the deflection of (monochromatic) light on the edges of the split.

A more complex pattern of interfering radiation is found with monochromatic light, falling through two close and parallel splits, but this phenomenon too, is caused by the same mechanism of deflection on edges. Even elementary particles, falling through two splits, show this pattern of interference, but the explanation will be more complicated, because the interference still occurs in the case that the particles pass one by one through the splits (see § 8.1).

With the above arguments it has been shown that the most important properties of energy transfer by radiation may be derived from the energon hypothesis. Though only those systems have been considered, which are mutual immobile, even the peculiar transfer of radiated energy between mutually moving systems can be deduced from the hypothesis.

In the next paragraph, the relation between the velocity of a moving emitter and the wavelength of the energy, absorbed by the receiver, the so called Doppler effect, is discussed.

10.3. The Doppler effect

The fact, that photons (*i*-codes) are always absorbed at the velocity of light, does not mean that the composing i_e-codes have been emitted with that velocity. According to the energon hypothesis, *pp*-emission happens with the spread of velocities *c±½c±vg*.

> *The sum of the velocity of the selected codes, with respect to the emitter (em) into the direction of the receiver (rc), and the velocity of the emitter, with respect to the the receiver, must be equal to c, if the emitter moves with axial velocity ± v with respect to the receiver.*

If the velocities of flight are called positive and the velocities of approach negative, the above condition for approaching systems can be expressed by:

$-c_x - v = -c$, with respect to *rc*, thus

$c_x + v = c$, or $c_x = (c-v)$, with respect to *em*, and for fleeing systems:

$- c_x + v = -c$, with respect to *rc*, or

$c_x = (c + v)$, with respect to *em*.

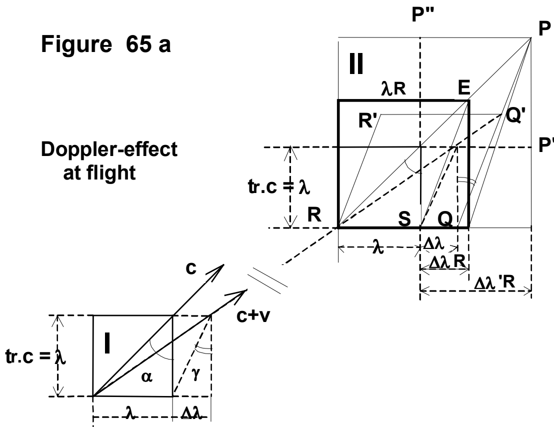


Figure 65 a

Doppler-effect at flight

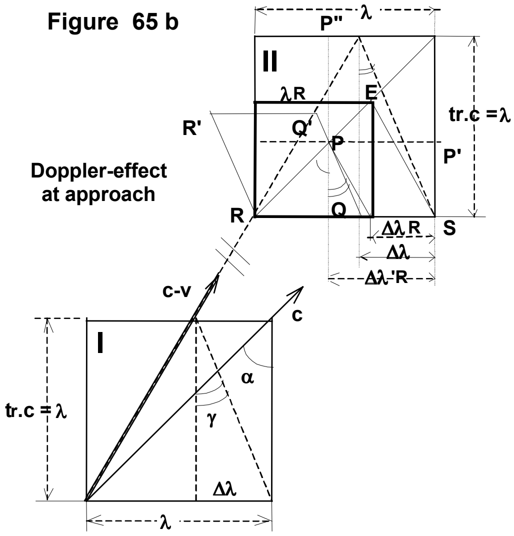
Only relative velocities that remain within the tolerance of velocity (v_q) do not influence the normal resonance. This influence does exist with velocities exceeding v_q : the approach makes the wavelength of resonance smaller, whereas the opposite happens at flight.

The relation between the relative velocities and wavelengths can be deduced with the aid of the so-called *dialograms*. **Figure 65 a** and **figure 65 b** depict dialograms of the situations of flight and approach, respectively. The derivation of the relation between velocity and wavelength will be described using figure 65a, but for approach the reasoning is similar. The combined i_e-codes (into a photon) from system *I*, passing through system *II* with velocity *c*, must have a wavelength $\lambda + \Delta\lambda$ with respect to *I*. The extended length $\Delta\lambda$ may be expressed by $\Delta\lambda = \lambda.\tan\gamma$, where $\tan\gamma = v$, representing the velocity.

> *Note that v is just a ratio without dimensions, because time and length are equalised in the dialogram.*

System *I* 'supposes' that the absorption of the photon (*i*-code) by system *II* has been completed within the parallelogram ***RR'Q'Q***, but in the 'opinion' of system *II*, the absorption must happen with the velocity of light, thus along the diagonal ***RE***. This discrepancy, resulting from the 'dialogue' between both systems, may be solved by the introduction of a *hybrid system*, as a compromise. In the hybrid system the wave front of the *i*-code moves with velocity *c* along ***RE*** according to system *II*, but it must reach in the same period of time a point ***P*** on the extended line ***QQ'***, according to system *I*. This point of intersection of both lines can only have a hybrid acceptation, which means that the projection ***P'*** of ***P*** will indicate the altered (wave)length in relation to the original length of time λ, by means of the product **(λ + $\Delta\lambda'_R$).λ**, or the altered period of time in relation to the original wavelength by projection ***P"*** of ***P***, by means of the same product.

Figure 65 b



In system *II* the unit of time must be equal to the unit of length too, so that both, the periods of time and the wavelength, have to be equal to the geometrical mean of the hybrid product:

$$\lambda_R = \sqrt{\left(\lambda + \Delta\lambda_R^{'}\right).\lambda} \quad .$$

From the dialogram can also be derived:

$$\lambda + \Delta\lambda_R^{'} = \frac{\lambda + \Delta\lambda}{\cot\alpha - \cot\left(90^0 - \gamma\right)}$$

, based on the triangle *RPQ* and the perpendicular $\lambda + \Delta\lambda'_R$, which gives :

$$\lambda + \Delta\lambda_R^{'} = \frac{\lambda + \lambda.\tan\gamma}{1 - \tan\gamma}$$

, because $\Delta\lambda = \lambda.\tan\gamma$; thus

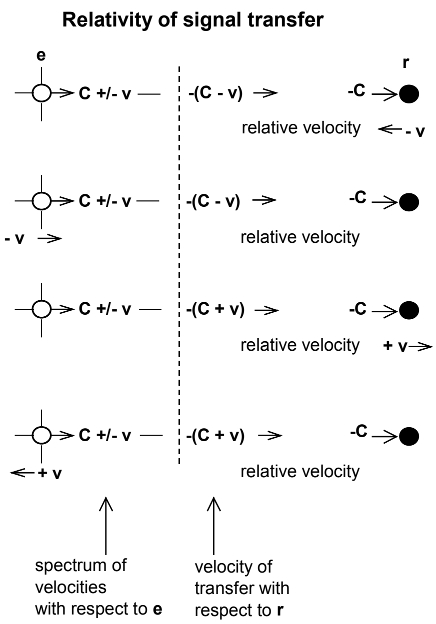
$$\lambda_R = \lambda.\sqrt{\frac{1+\tan\gamma}{1-\tan\gamma}} = \lambda.\sqrt{\frac{c+v}{c-v}} = \lambda\,.\sqrt{\frac{1+v/c}{1-v/c}} \approx \lambda\,.\left(1+v/c\right),\ if\ v << c$$

in which v is positive at flight and negative at approach.

This result agrees with the experiments. It indicates that, at absorption of a photon from a moving system, the receiver uses a couple of energy levels, different from those of the emitter. The only condition is, that the *i*-code moves through the receiving system with light velocity. This permits interaction between nucleus and orbiting electron with light velocity, at the right sequences of periods of time.

10.4. Relativity of signal transfer

The velocity of signal transfer between all particles, approaching as well as fleeing, is thought to be ruled by the observing system.



In the next scheme the signal transfer is pictured (see § 10.3). In the first two rows an approaching velocity between emitter (*e*) and receptor (*r*) is indicated on two ways by the symbol *-v*. In the rows three and four the fleeing velocity is indicated by *+v*.

At approach the receptor selects the signal *-(C-v)* from the emitted spectrum of velocities, approaching with velocity -C+v-v = *-C*.

At flight a selection of signal *-(C+v)* is made, causing a reception with velocity -C-v+v = *-C*.

This view on the mechanism of signal transfer must be valid for all observers.

Two of it have been given in **figure 66**, depicting a rotating double star (A) and two rotating observers (B). As can be seen in the pictures *A* and *B*, the velocity of signal transfer is equal to the velocity of light, with respect to the observer.

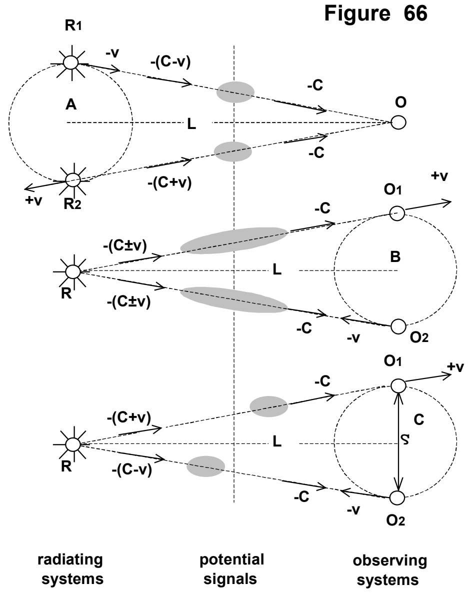
Thus far, the phenomena of electromagnetic interaction between material systems could be described by the energon hypothesis in a way, which did not contradict the special theory of relativity and the experimental results.

However, an important exception is thinkable, according to the energon-hypothesis.

We meet this exception with a regulating third observing system, that can achieve a complete synchronization (S'), by bringing two primary synchronized observing systems into opposite positions of a circular orbit around its own system. A point-event at large distance, as pictured in Fig. 66-C, cannot be observed now by both observers at the same time.

As is expected by the energon hypothesis, the relativistic difference in time between the central clock and those on the orbiting modules is much lower than the difference in arriving time of a signal from a far away source, as seen by the two, relatively fast moving, observers. Moreover, this small difference can be corrected. According to the hypothesis, the difference in arriving time of the signal is proportional to the distance between the light source and the observing system, expressed in light-seconds. It is also proportional to the difference in velocity of the observers with respect to the source, expressed in *c*-units, if these velocities are low with respect to *c*. It can be written as:

Figure 66



$$D_t = \frac{\left(D_v \pm v_q\right)}{c^2} \cdot L \ ,$$

D_t = difference in arriving time of the signals
D_v = difference in velocity of the observers
v_q = tolerance of velocity (see § 10.1)
L = distance between source and observing system
c = velocity of light

This formula is bordered by ultimate values of D_v and v_q.

Only if D_v happens to be substantially larger than v_q, a value of D_t is found. Probably, v_q depends on the frequency of the radiation and on the ratio between the diameters of the orbiting electron and its orbit in the receiving atoms, being about 10^{-7} , which means that v_q may be smaller than 10^{-7}.c, or $v_q \leq 30\ m.s^{-1}$.

The values of D_v may not be too high with respect to *c*.

The length of the paths to be covered by the double-signals amounts to:

$L_1 = L + v.L/(c+v)$ and $L_2 = L - v.L/(c-v)$, and the needed periods of time are:

$t_1 = L_1/(c+v) = L/(c+v) + L.v/(c+v)^2$ and $t_2 = L_2/(c-v) = L/(c-v) - L.v/(c-v)^2$

The difference in arriving time of the two signals amounts to:

$$t_2 - t_1 = \frac{L}{c-v} - \left[\frac{L.v}{(c\text{-}v)^2}\right] - \frac{L}{c+v} - \left[\frac{L.v}{(c+v)^2}\right] \approx \frac{2.L.v}{c^2\left[-v^2\right]}$$

The values between [..] may be omitted if relatively being very low.

At the present state of technology, it must be possible to measure the difference in arriving time of a signal, coming from a distant object. For instance, an observer on earth can bring two modules into an earth-orbit at 200 *km* above the surface in opposite position. The two modules have to be equipped with receiving-, sending- and recording apparatus with synchronous clocks. This can be made possible because the modules will be exposed to an equal acceleration (equal energy). A third module at a large distance, moving in the extended plane through the orbit, can be ordered by the observer to send a signal that will be receivable at the moment that the orbiting modules are practically at equal distances to the sending module. The stations can maximally have the relative velocity

$2 \times 7.79418 \times 10^3 = 1.5588 \times 10^4$ *m/s*, see Supplement.

The difference of speed with the sending module depends only on this relative velocity. Suppose that the distance to this module, at the moment of emission, is 6.3×10^{11} *m* (about the shortest distance between Jupiter and the earth). The difference in arriving time of the signal for both observers can then be calculated according to:

$$D_t = \frac{1.5588\,\text{x}10^4\,\text{x}6.3\,\text{x}10^{11}}{\left(2.998\,\text{x}10^8\right)^2} = 0.109\,s$$

on the condition that v_q may be neglected.

The smallness of it, coupled with the fact that observations are usually made independently, makes it believable that this effect has not been noticed thus far. As the effect grows with the distance, it may be observed as well by comparing the results of measurements on point-events at stellar distances (exploding stars, for example), from different positions of an earth orbiting module.

If the orbiting modules have the possibility to register also the frequency of the received signals, it will be found that the first received signal has become a lower frequency than the secondly received signal.

Perhaps this *eros of light velocity* (Effect of Related Observations at Speed-difference) may be an instrument for more accurate measurement of galactic distances.