

THE DAON THEORY

Fundamental Electro-magnetics

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Abstract

We here present **The Daon Theory** it is the first real Theory of Everything, which means that all fundamental physics is explained, all fundamental constants are calculated, and that all results agree with experiments. The explanations are simple and logical since we use 3D+time which leads to easy mathematics. We present here the explanation to all fundamental electromagnetic phenomena: Electricity, Magnetism, Induction and Electro-Magnetic waves.

1 General introduction

We have shown that all masses are surrounded by a neutral media [3][4], giving a local reference frame, which means that the relativity theories of A. Einstein are wrong!

We also presented a general reference frame, which can be used in all situations. In our case, we will simply use the laboratory as reference frame, which according to [4] is a sufficiently good approximation.

Our knowledge of the world around us is very shallow. We are still not able to answer questions like: What is potential-charge? What is mass-energy? What is force-field?

The main reason for the difficulties connected with the type of questions above, is that the field concept is very obscure.

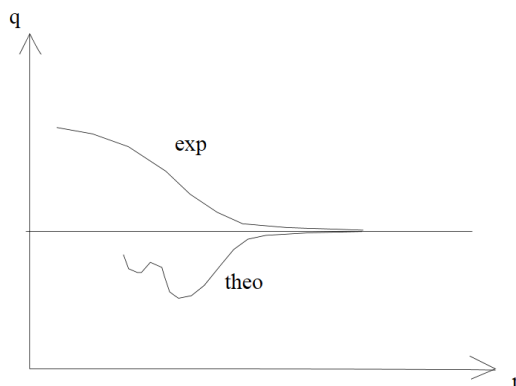


Figure 1: Schematic description of the theoretical and experimental behaviour of the charge, acting between an electron and a positron, relative to the distance between them.

”Mainstream physics” try to explain the field as produced by virtual particles but, if virtual particles can pop-up from space (like a magician pulling one rabbit after another from his hat) then their anti-particles have to have negative mass-energy?!

They tried to find some demonstration of virtual particles at the Large Electron Positron collider (LEP) at CERN. In the interaction, at high energies, between an electron and a positron several types of virtual particles such as ν, e, μ, π, \dots should show up. A variation of the charge (force) was expected, due to the difference in energy needed for the creation of each specific virtual particle i.e., when the distance between the particles are sufficiently short, the energy should be sufficient to produce a new type of virtual particle. However experiments show a monotone curve of the charge, as presented schematically in figure 1, i.e. there is no structure in the graph. The conclusion must be that *virtual particles do not exist around the electron or the positron which means that all theories based on virtual particles are wrong!*

An electromagnetic field is possible only if a media exists! But, such a media must be without mass since otherways the EM-energy would be transmitted to the media and therefore quickly reduce the emitted power. The mass can be considered to be some sort of resistance to any change (acceleration). So no mass means something without resistance to changes. This means that all interactions, within such a media, must happen with a constant velocity in all directions!

A positive electric field must be identical to the negative one (at least at some distance from the source).

We propose here the most basic and simple hypothesis:

It exists only one unique object as building block for everything within the Universe!

The name **DAON**¹ is chosen for this specific object.

1.1 The Daon

The earth is constituted by an enormous amount of charges, with an identical number of positive and negative ones, which means that there must be a huge amount of daons surrounding the earth, extending versus infinity.

A daon must be associated with a direction, necessary to explain the interaction between different charges. Such a direction can only be a rotation around an axis. A daon must therefore be a rotating entity.

There is no privileged direction in space, it's therefore necessary that all possible directions of the daons rotational axis are equally represented. These *disordered* daons will have a growing importance, they therefore deserves a specific name, they will henceforth be called *free daons*. They fill up all space besides the space occupied by *ordered* daons. The space is neutral and isotropic so the free daons must be in equilibrium so that their *medium* value of contraction is equal to their *medium* value of expansion. In the same way their *medium* value of attraction must be equal to their *medium* value of repulsion.

An electron must be a stable and well ordered set of daons, therefore, if an electron is placed within a media of free daons, the daons have to become more and more "ordered", closing in on the charge, until the increased order is matched and a radial equilibrium is established. There is therefore a gradual passage, from disorder to order, going from "far away" versus the center of the electron.

The daon can not have any mass, since a mass would make it impossible for any particle to move within the media of free daons, the reaction between two daons must therefore be without acceleration, i.e., at a constant velocity.

¹Dao (Tao) is a fundamental concept in the old chines culture, it is the road through the universal harmony. It's constituted by Yin (darkness, cold, contraction, rest) and its opposite, Yang (light, warmth, expansion, activity)

This is the reason why we do not call the daon a particle but an *object* and why we use the formulation *action* instead of *force*.

The action becomes a force when several daons are attracted towards each other and interact with an external field, since then the total action must be divided between the participants, leading to a resistance i.e., a mass (as defined by Newton).

The interaction between daons is such as to maintain the daon's velocity of rotation at a constant value. This is necessary since otherwise the interaction would reduce the medium velocity of rotation of the daons to zero!

The attraction/repulsion between two daons must depend on the relative direction of motion, of their respective substances, in the zone of interaction. Four specific situations of interaction, between identical daons, is proposed, in figure 2:

- (a) The substance of the respective daon are, in the zone of interaction, rotating in opposite direction at the same speed. The daons feel an *attraction*, coming from the surface of interaction, leading to a *reduction* of the daon sizes. The daon substances relative velocity is maximal in the zone of interaction, there is here no transverse action!
- (b) The substances of the respective daon are, in the zone of interaction, rotating in the same direction at the same speed. The daon substances relative velocity in the zone of interaction is zero. The daons feel a *repulsion*, leading to an *increase* of the daon sizes, also here without transverse action.
- (c) The substance of the respective daon are, in the zone of interaction, rotating in the same direction. In this situation the daons *angular* velocity vectors have an angle between them, but the respective daon substances have still parallel velocities, in the zone of contact! The attraction between the daons, along a line passing their centres, is identical to the situation in *a*). There is no transverse action, since the substances velocities are parallel in the zone of interaction.
- (d) The substance of the respective daon are, in the zone of interaction, rotating with an angle relative to each other. In this situation the daon substances velocity vectors have an angle ψ between them, as also their angular velocity vectors. The attraction between the daons, along a

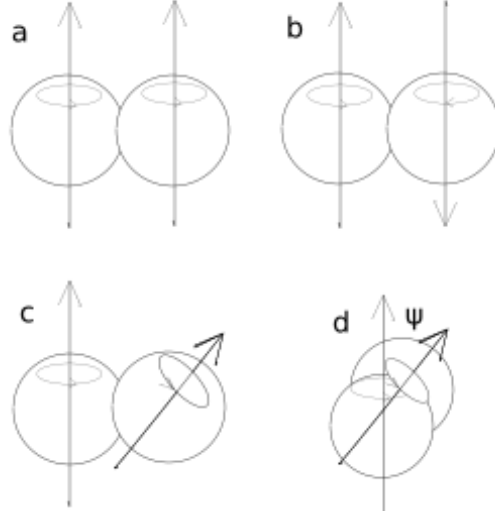


Figure 2: Four representative positions of interaction between two daons.

line passing their centres, is then proportional to $\cos \psi$, whereas the transverse repulsion is proportional to $\sin \psi$, in the zone of contact.

The action-reaction between daons must be independent from the position of the zone of interaction. If the attraction was stronger on the daons equator, the size of the daons would be locally reduced i.e., the form of the daons would become elliptical. This would mean a dependence on the order which, would make it impossible to create a radial equilibrium at electron's centre. It is therefore necessary that *a daon's action-reaction depends only from the relative direction of the daon substance velocities and not on the position of the zones of interaction!* It follows that *a daon must in medium be spherical*

The daon change size under interaction but the medium change of size must be zero in a situation of equilibrium, i.e. *the effective attraction, contracting a daon, must then be equal to the effective repulsion expanding it.*

An interesting thought is the following: If two isolated daons have an interaction, the size of the two daons should rapidly change until the end of interaction. The sizes of such daons would then vary dramatically so that a smooth behaviour of any interaction, like electromagnetic fields and waves, would be difficult to understand, it follows that, *a daon without interaction*

must expand until inhibited to do so by its neighbours i.e., a daon must always be in contact with other daons.

The attraction-repulsion between identical daons, in a situation of equilibrium and in the direction of a line connecting the two daon centres, can therefore be written,

$$a_{d\parallel} = -C\omega_d^2 r_d \cos \psi \quad (1)$$

ψ is the angle between the directions of the two daon-substances velocities in the zone of contact. ω_d is the angular velocity of the daon substance and r_d is the daon radius. C is an unknown constant.

The daons will also obtain a transverse repulsion, perpendicular to the one indicated above, which in the same way, can be written

$$a_{d\perp} = C\omega_d^2 r_d \sin \psi \quad (2)$$

The Daon substance velocity of rotation, is then

$$v_d = \omega_d r_d \quad (3)$$

It should be noted that a daon's substance velocity must be faster than the effective velocity of its rotation, since the interaction between two daons must modify their size. It is therefore necessary to include a radial velocity of the daons substance, leading to a reduction of the azimuthal velocity of rotation. It is therefore the *effective* velocity of rotation which we use in our calculations.

1.2 An electron takes form

The consequences of the equations of Maxwell indicate that the source of the Electro-Magnetic field is the charge. It is therefore necessary to focus our effort on a charged particle, to obtain some basic knowledge of the corresponding physical phenomena. The electron seems to be the most simple construction of nature but contains at the same time most of the basic unknowns in today's physics, such as charge, mass, field, associated wave, ...

Supposing that daons are the constituents of the electron makes it necessary to believe that the positron, its anti-particle, is constituted by objects

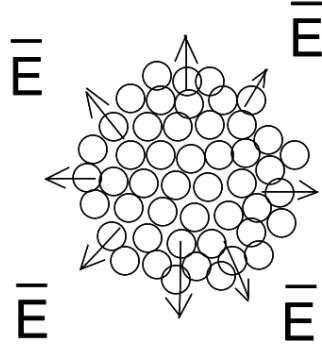


Figure 3: Schematic picture of a cut through the center of an electron

in all identical to the daons of the electron but having some characteristic giving it the opposite effect in the radial sense. An anti-daon could here be suggested but the interaction between daons must be such that an anti-daon must be the daon turned around into the opposite direction, the daon must therefore be identical with its anti-daon. The necessary action between daons must then come from a rotation i.e. *the substance of a daon must rotate around an axis, giving a direction to the daon.*

These objects must be much smaller than the electron, since no granularity has been noticed in the various interactions.

The only possible difference between an electron and a positron must then be that if the positron daons point inwards, the daons of an electron must point outwards from the center (this definition of direction gives the correct direction of the magnetic field around the electron).

Now try to imagine the daons constituting a shell around an electron, all pointing in the radial direction, relative to the center of the electron. Around this daon shell is another one, constituted by daons all again pointing in the same radial direction as the daons in the previous shell etc. The result will be something looking similar to the schematic cut of an electron in figure 3. The same should then be true for a positron besides the direction of its daons being inverted, relative to the electron.

This gives a model of an electron where the constituents of the electric field are also the constituents of the electron itself. All physical characteristics of an electron must then be due to the collective action of the daons constituting it.

Let us now imagine a concentric shell, filled with daons kept together by an attraction between daons having quasi-parallel rotational axis, all pointing, in medium, in the radial direction. The daons within such a shell must be kept together because of the daons attraction towards each other. The daons must also be attracted to the daons of the upper and under laying shells, since also these must have the same, quasi parallel, direction of their rotational axis. The strongest attraction, between daons from different shells, is found in the middle of a triangle of daons in a shell. The daons belonging to neighbouring shells therefore place themselves preferentially into these positions. The expansion/contraction and attraction/repulsion of each daon must in medium be zero, in any static situation. In case of the electron, each daon is necessarily in equilibrium within its own shell, since the daons are identical and placed symmetrically around it.

Imagine a daon, as a sphere of some substance wanting to expand but stopped, by the surrounding neighbours, to do so. A daons surface can then be separated into zones of interaction and zones of non-interaction. Some zones are alternating between compression and expansion, since the daon is rotating. There are also zones having no interaction besides a "will" to expand. This means that a daon is kept together by some sort of elasticity; otherwise the continued expansion of zones of non-interaction would make the daon "explode".

The number of daons in a shell is

$$N = \frac{4\pi r^2}{\pi r_d^2} \frac{\pi}{2\sqrt{3}} \quad (4)$$

$\frac{\pi}{2\sqrt{3}}$ is the "filling factor" of circles on a plane surface. The number of daons in a shell is very high, besides in the last couple of shells at the electron's center, so the curvature has been neglected.

The daons can move around freely, in a region where the order is very low, meaning that the shells have no "rigidity". The *total* attraction between neighbouring shells, far from the electron's center, is then almost constant. The radial component of interaction, between daons in the same shell, becomes important closing in on the electron's center, since the size of the daons is continuously decreasing, in neighbouring shells. A daon must adapt its radius so that its attraction is constant in all directions. The equilibrium is obtained, when the attraction is equilibrated around each daon.

The radial component of attraction, on an individual daon, from the upper layer must be equal to the radial attraction from the lower layer plus, the radial component of attraction coming from the daons of its own shell. The total radial attraction between two shells can then, with the help of equations (1)-(4), be written

$$f_n = 3Na_d \langle \cos^2 \psi \rangle \cos \phi + 6Na_d \sin \chi \quad (5)$$

ϕ is the angle between the electron radius and a line passing the center of two interacting daons, in different shells ($\cos \phi \simeq \sqrt{\frac{2}{3}}$). The second term is the radial component of interaction between each daon and its 6 neighbours within the same shell, giving the increase of the action (and the number of daons) from a shell to the next ($\sin \chi \simeq \frac{r_d}{r}$).

The attraction between two shells, far from the electron, can now be expressed in the following way:

$$f_n = N3 C \frac{v_d^2}{r_d} \langle \cos^2 \psi \rangle \cos \phi = C\sqrt{8\pi} \frac{r^2}{r_d^3} \langle \cos^2 \psi \rangle v_d^2 \quad (6)$$

$\langle \cos^2 \psi \rangle$ is the medium radial coupling in the interaction between daons.

Each daon has 3 interaction zones with the daons of the next neighbouring shell. The examined daon and three daons in the next shell, have the geometry of a regular pyramid.

A daon's radial size has strong variations, due to the contraction and expansion in the interaction between daons. In the electron's centre, where the order is almost perfect, the daons have a geometry similar to a deformed star with 6 points, in the interaction between daons within the same shell, whereas a deformed triangular shape is the geometry between daons from neighbouring shells. This strange geometry of a daon, will of coarse changed when the order is reduced, even if the strong variation of the radius will persist. In the following we will use a medium radius, giving a sphere.

1.3 The Order

The disorder produced by the surrounding free daons must pass through the ordered daons, since the number of surrounding free daons is much bigger than the ordered ones.

The equilibrium around an electron can therefore be written as a number of perfectly ordered daons, placed on a sphere around the electron, subtracting the action from completely disordered free daons placed on the same sphere. We get:

$$\begin{aligned}
 NC \frac{v_d^2}{r_d} \langle \cos^2 \psi \rangle &= NC \frac{v_d^2}{r_d} - N_{fd} C \frac{v_d^2}{r_{fd}} \\
 \Rightarrow \langle \cos^2 \psi \rangle &= 1 - \frac{r_d^3}{r_{fd}^3}
 \end{aligned} \tag{7}$$

r_{fd} is the radius of the free daons. The index fd is hereafter used for free daons.

The daons are attracted to each other due to their order, whereas disorder produce an irregular action in all directions.

The interaction between two parallel daons of different size is presented in figure 4, is

$$a_d = C \frac{v_d^2}{\sqrt{r_d^+ r_d^-}} \tag{8}$$

$\sqrt{r_d^+ r_d^-}$ is the effective radius of interaction, being the geometrical mean of their respective radii.

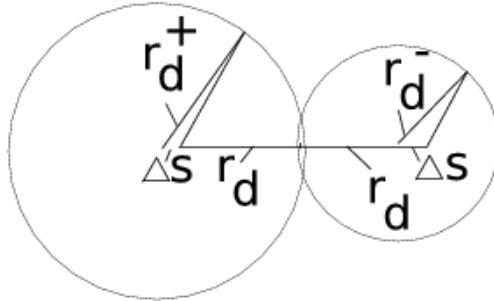


Figure 4: Geometry of the interaction between two daons having different size.

The order must become very low, at a distance sufficiently far from the electron's centre, i.e., a shell has there no "rigidity". The daons within such a shell are constantly replaced by the surrounding ones, but, the shells remain always in position, so that each shell has the same radial action to maintain the equilibrium. The radial action must therefore be constant, "far away" from the electron's center. We get, using equations (6) and (7),

$$\frac{r^2}{r_d^3} \langle \cos^2 \psi \rangle = \frac{r_e^2}{r_{dfd}^3} \quad \Rightarrow \quad \langle \cos^2 \psi \rangle = \frac{r_e^2}{r_e^2 + r^2} \quad (9)$$

r_e is a radius of reference which is constant when the shells have no rigidity. This radius will henceforth be called the electron's reference radius and denoted $r_{e\infty}$. But, the above equation can be used at any distance, if we allow r_e to vary close to the electron's center, where the action of the radial equilibrium is reduced.

The radial force, i.e., the action between two shells, far from the electron ($r \gg r_{e\infty}$) can now, by using equations (6), (7) and (9), be expressed as

$$f_\infty = C\sqrt{8\pi} \frac{r_{e\infty}^2}{r_{dfd}^3} v_d^2 \quad (10)$$

We will here introduce a fundamental definition, which we will use frequently in the following:

The Order **O**

$$O = \langle \cos^2 \psi \rangle = \frac{r_e^2}{r_e^2 + r^2} \quad (11)$$

which gives

$$\frac{O}{1-O} = \frac{r_e^2}{r^2} \quad (12)$$

the size of the daons are continously reduced closing in on the center, but, the size of the daon are decided by the size of the surrounding free daons so that a daon can't reach size zero, i.e., perfect order doesn't exist!

2 Fundamental Electricity

Let's imagine two electrons without any movement relative to each other and relative to the surrounding free daons, placed at a distance $a \gg r_{e\infty}$ from each other, as presented in figure 5.

The action in the middle between the two electrons, is between two shells associated to different electrons. An interaction between such shells means an action of repulsion ($\cos \psi < 0$) since the rotational axis of their respective daons are opposite in direction i.e. the daons should expand, under such an action. How can then the radial equilibrium be maintained?

A daon deforms without any resistance so an individual daon can adapt itself to any situation. In the above case the size of the daons, between the two electrons, is bigger than for an isolated electron. These bigger daons, must have a bigger angle ($\sin \chi_n$), between the daons within the same shell, to compensate for their increased size and therefore smaller number. A similar situation can be seen on the opposite side of the electron, here the daons reduce their sizes, giving a lower radial component, of the action between the daons within the same shell. The size of the daons will then decrease, adapting themselves until an equilibrium is reached.

2.1 Coulomb's law

We will from now on speak about force instead of action, since the acceleration of an ensemble of daons, due to an external action, must be the action divided by the number of effective ordered daons i.e. the mass.

The force between two electrons, at a distance a , can now be obtained by integrating the radial force ($\frac{f_s}{4\pi r_2^2}$), coming from the source electron over the shells of the target electron. This follows from the fact that each electron must maintain its radial equilibrium, necessary since the surrounding free daons always have a constant disorder, independent from the situation. The resulting force on a shell n , can therefore be obtained, using equation (10), in the following way

$$\begin{aligned}
 f_n &= \int_0^\pi \int_0^{2\pi} m_d \frac{f_s}{4\pi r_2^2} \frac{O}{1-O} \cos \theta' \cos \theta r_1^2 \sin \theta \, d\theta \, d\phi \\
 &= m_d \frac{f_s}{3} \frac{r_{e\infty}^2}{a^2}
 \end{aligned} \tag{13}$$

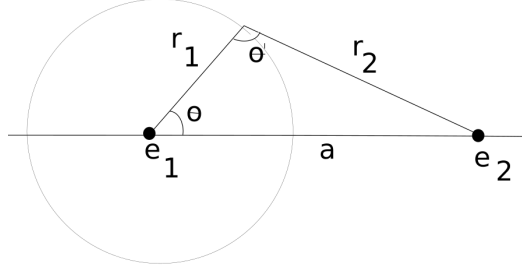


Figure 5: Schematic view of two electrons under interaction.

$$\begin{aligned}\cos \theta' &= \frac{r_1^2 + r_2^2 - a^2}{2r_1r_2} \\ r_2^2 &= a^2 + r_1^2 - 2ar_1 \cos \theta\end{aligned}$$

m_d is a system constant corresponding to the daon "mass", whereas θ' is the angle between the medium direction of the rotational axis of the daons in the selected shell and the medium direction of the superimposed daons of the source electron.

The sum of the force between the electron shells gives then the total force. The distanced between shells is very small, compared with the shell radius, so the sum can therefore be replaced by the integral. We obtain the Coulomb force as

$$F_C = \int_0^a \frac{f_{n+1} - f_n}{\Delta r_n} dr \quad (14)$$

$\Delta r_n = \sqrt{\frac{8}{3}} r_{d_n}$ is the radial distance between two shells.

This means that *the Coulomb force is directly proportional to the density of the radial force, of the daons belonging to the source electron, at the position of the target electron!* The result will be identical if we invert the positions of the two electrons.

The shells starts to deform and the reference radius (r_e) is reduced, if the electrons are very close, so we will therefore calculate the equation (14), at a distance between the two electrons much bigger than r_{e_∞} . We can then make the integral over any shell, since "far away" all the shells have the same

constant charge, so if the source electron is at a distance sufficiently far away, the reference radius becomes constant ($r_e = r_{e\infty}$), we get

$$f_c = \int_0^\pi \int_0^{2\pi} \frac{f_n}{4\pi r_1^2} \frac{r_\infty^2}{a^2} \cos^2 \theta r_1^2 \sin \theta d\theta d\phi$$

and the total force becomes

$$\vec{F}_C = \frac{f_\infty}{3} r_{e\infty}^2 \frac{\vec{r}}{r^3} \quad a \gg r_{e\infty} \quad (15)$$

If we compare this equation with the classical electrostatic formula:

$$\vec{F}_C = \frac{e^2}{4\pi\epsilon_0} \frac{\vec{r}}{r^3}$$

we get the definition of the Coulombs constant as

$$\frac{e^2}{4\pi\epsilon_0} = \frac{f_\infty}{3} r_{e\infty}^2 \quad a \gg r_{e\infty} \quad (16)$$

i.e., the Coulombs constant is proportional to the radial force of the electron.

It's now possible to redefine, within the daon theory, the concepts of force-field, charge-potential and energy-mass of an electron.

- The electro-static force \vec{F} is the force acting between the external superimposed order daons and the radial equilibrium of the charges contained in the target.
- The field concept can be understood as the order (or more exact $\frac{O}{1-O}$) of the external daons surrounding a charge. An "electric force line" coincides with the medium direction of the daons rotational axis.
- In the daon theory the charge is just an integer number; it is the number of "positive" radial equilibrium minus the "negative" ones, e.g., in the case of the electron it is -1.
- The electro-static potential is the mass following the charge (at a certain radius r) multiplied by c^2 .

- The electro-static energy is just the mass, i.e. the number of effective daons, multiplied with c^2 .

$E = 1 \text{ MV/m}$ corresponds to an Order of ($O \simeq \frac{r_e^2}{r^2}$) of around 10^{-15} !

2.2 The electron's mass and potential energy

We can now calculate the electron's mass in the following manner:

$$m_e = m_d \int_0^\infty \frac{4\pi r^2}{\pi r_d^2} \frac{\pi}{2\sqrt{3}} O^2 \frac{dr}{\Delta r} \quad (17)$$

i.e. the number of daons in a shell multiplied by the interaction (the Order or the medium action of interaction $O = \langle \cos^2 \psi \rangle$), giving the number of effective daons (the mass) of the shell, which is again multiplied by \mathbf{O} , which gives the tendency of the daons to follow the electron in its movement. The electron's reference radius (r_e) varies with the radius close to the electron's center, we have therefore not an exact analytical expression.

But, we can calculate, at a radius $r \gg r_{e_\infty}$, the difference in mass due to the added order coming from the interaction between two electrons, i.e. the potential energy. We can then make a precise calculation of the added mass as

$$\begin{aligned} \Delta m &= m_d \int_a^\infty \int_0^\pi \int_0^{2\pi} \frac{r^2}{\pi r_d^2} \frac{\pi}{2\sqrt{3}} \cos \theta' \sin \theta O_1 O_2 d\phi d\theta \frac{dr}{\Delta r} \\ &= m_d \frac{\pi}{\sqrt{2}} \frac{r_{e_\infty}^4}{r_{d_{fd}}^3 a} \quad a \gg r_{e_\infty} \end{aligned} \quad (18)$$

If we now introducing equation (10) into equation (18) and use the classical potential energy, we get

$$C = \frac{3}{2} \frac{c^2}{v_d^2} \quad (19)$$

The radial attraction between identical daons Eq. (1), can therefore be written

$$a_d = \frac{3}{2} \frac{c^2}{r_d} \cos \psi \quad (20)$$

and the corresponding transverse action is

$$a_d = \frac{3}{2} \frac{c^2}{r_d} \sin \psi \quad (21)$$

which gives the radial equilibrium of force, "far" from the electron's center (10), as

$$f_\infty = 3\sqrt{2}\pi \frac{r_{e_\infty}^2}{r_{d_{fd}}^3} m_d c^2 \quad (22)$$

The Coulomb's law within the daon theory, using equation (16), is therefore

$$\vec{F}_C = m_d \frac{q_1 q_2}{e^2} \sqrt{2} \pi \frac{r_{e_\infty}^4}{r_{d_{fd}}^3} c^2 \frac{\vec{r}}{r^3} \quad (23)$$

$\frac{q}{e}$ is number of effective radial equilibrium, within a particle.

2.3 Internal characteristics of the electron

A better understanding of the electron is necessary, to make us able to complete the analysis. A computer code called EP was therefore developed to examine the electron's internal equilibrium.

The electron is perfectly spherical so, it's enough to optimize the radial position of each shell of constant order (interaction) ($O = \langle \cos^2 \psi \rangle$). We therefore start by choosing some approximate radial position for a number of shells.

The equation of radial equilibrium (5) can then be used to calculate the order in each shell. Starting far from the electron, where the radial equilibrium has an asymptotic constant value, we proceed in iterations step by step closing in on the electron's center, finally obtaining a mesh with a radial equilibrium of force.

It is thereafter necessary to normalize the radii relative to a true electron. This is done in two steps; first we vary the value of r_{e_∞} , until the total mass

of the simulated electron agrees with the true value. This is done, using equation (22), within the code EP. We obtain $r_{e\infty} \simeq 1.1450 \cdot 10^{-15} \text{ m}$.

The free daon size $r_{d_{fd}}$ and the system constant m_d are still missing, but, it is enough to find one to find the other, according to equations (16) and (23). Their values can be obtained examining the shells at the electron's center, since the force in the centre must go to zero. We adapted the free daon size, so that we obtain a minimum number of daons in the first shell.

We get $m_d \simeq 1.0 \cdot 10^{-40} \text{ kg}$ and $r_{d_{fd}} \simeq 7.0 \cdot 10^{-19} \text{ m}$, at the above mentioned limit. We have then a mesh with a radial equilibrium of force, as well as, an agreement between its mass and the true electron mass. It should be noted that the precision for $\frac{m_d}{r_{d_{fd}}^3}$ is 4 digits whereas its much less for the individual components, due to the unknown 3D-geometry at the center of the electron.

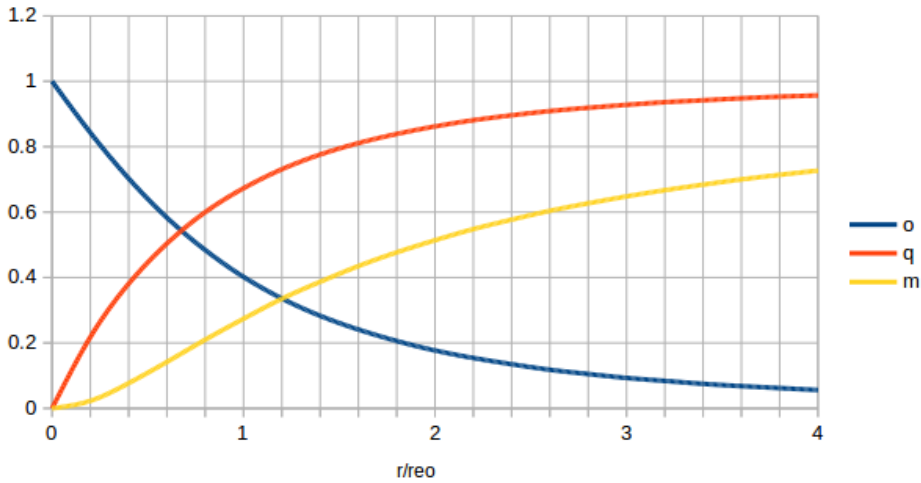


Figure 6: Graph showing the radial variation of the order (O), the normalized radial force ($\frac{r_e^2}{r_{e\infty}^2}$) and the normalized mass ($\frac{m}{m_e}$), relative to the normalized electron radius $\frac{r}{r_{e\infty}}$.

In figure 6 is presented a graph showing the radial variation of the simulated electron's main parameters, when the electron has no velocity relative to the free daons.

3 Fundamental Magnetism

Imagine an electron, travelling at a constant velocity \mathbf{v} , within a media of free daons. It then exists a relative velocity between the electron and the surrounding daons. The shells of daons around the electron still exist but, the daons constituting them are gradually replaced by new ones, depending on the strength of their attraction relative to the electron.

The velocity of a signal, extending from the electron, becomes an important parameter, it will in the following be called the signal velocity. The velocity of a signal, passing through a daon media, must depend on the substance velocity inside the daons them selves, but could also depend on the relative direction of the substance, i.e. the position of the zones of interaction relative to the direction of the signal. But, a dependence on the relative inclination of the daon axis would produce a gradual reduction of the signal's velocity and/or strength, which doesn't agree with experience (e.g. Maxwell's equations). The signal velocity must therefore be defined, as a constant velocity in all directions, in the following manner

$$c_s = K\omega_d r_d = K v_d \quad (24)$$

r_d is the daon radius and v_d is the daon's effective velocity of rotation at its equator, whereas K is an unknown constant.

The shells are attached to the electron through the radial force, which is constant for each individual shell, if $r \gg r_{e\infty}$. The velocity of a daon, relative to the free daons, can therefore be written:

$$v_d = v O_n \quad (25)$$

where v is the **relative** velocity between the electron and the free daons. O_n is the order of the selected shell.

A signal from the electron's center reach, at the same time, the surface of a sphere around the electron, having the form presented in figure 7,

$$r = r_0(\cos \alpha - \beta(1 - O) \cos \theta) \quad (26)$$

$$\cos \alpha = \sqrt{1 - (1 - O)^2 \beta^2 \sin^2 \theta}$$

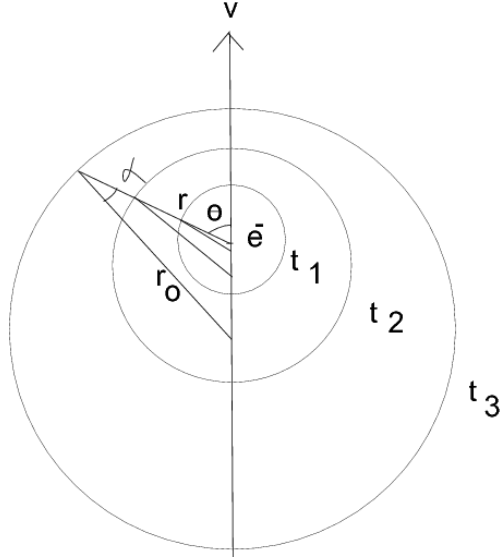


Figure 7: Spheres reached, at the same time, by the "delayed" signal coming from the electron's center

$$\beta = \frac{v}{c_s}$$

r_0 is the radius of a shell without velocity relative to the free daons.

Looking at the inclination of the daons at a fixed angle (θ), we find a different angle (α) of inclination for daons in different shells. The difference in inclination must then be the source of a rotation, according to equation (21), around the electron's velocity vector \vec{v} .

The relative inclination δ between daons from neighbouring shells, due to the delayed potential, can be expressed as:

$$\sin \delta = \frac{v(O^+ - O^-) \sin \theta}{c_s} \quad (27)$$

This difference in angle, of the daons axis of rotation, must therefore produce a rotation of the daons around the electron, giving a relative difference of velocity between neighbouring shells, which can be written:

$$\Delta v_\phi = \omega_d r_d \sin \delta \quad (28)$$

The daons rotational velocity, around the center of their respective sphere, as seen from the surrounding free daons, is then

$$v_\phi = \frac{v}{K} O \sin \theta \quad (29)$$

3.1 Inertial movement of the electron

The relative velocity between the daons, in the direction of the electron's velocity vector, gives a sliding movement between the daon shells that can be written (see eq. (29)),

$$v = \frac{v}{K} O \sin \theta \quad (30)$$

If we then look at the limit $v = c$ we get $K = 1$ and $c_s = c$

The velocity of rotation is therefore directly proportional to the velocity of propagation.

This is the reason for the electron's inertial movement, since then all forces are perfectly compensated.

3.2 Loi de Biot-Savart

The basic equation of magnetism, shows that the force is proportional to the velocity of the electron and to a "magnetic field".

$$\vec{F} = e\vec{v} \times \vec{B}$$

This magnetic field, within the proposed theory, can only be a flux of daons, as presented in figure 8(a).

Imagine an electron with a velocity \vec{v}_1 , at a distance a from another electron, which has a velocity \vec{v}_2 . The daons circulating around the source electron will pass around the examined electron. The examined electron must

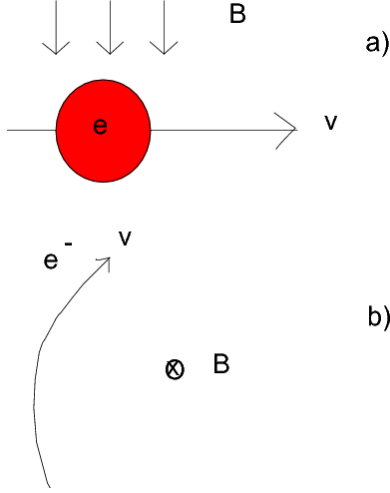


Figure 8: Phenomenon of magnetism.

therefore start to rotate, this rotation will continue to increase until it reach an equilibrium, which happens when its velocity of rotation, corresponds to the velocity of the daon flux surrounding it. This rotation must bend the electron's velocity vector in the direction of rotation, leading to a change of the electrons direction of flight, as presented in figure 8(b).

The perpendicular magnetic action do not change the absolute value of energy or momentum of the electron, it only deviates its trajectory!

We now calculate the intrinsic force, corresponding to an electron's velocity, in the direction of flight. This can be calculated imagining that the electron is fixed relative to its surrounding but having a rotation corresponding to its initial velocity. The inherent force parallel to the velocity vector \vec{v} can then be calculated to

$$\begin{aligned}
 F_{\parallel} &= m_d \int_0^{\infty} \int_0^{\pi} \int_0^{2\pi} \frac{r^2}{\pi r_d^2} \frac{\pi}{2\sqrt{3}} C a_d O \sin \delta \sin \theta \sin \theta d\phi d\theta \frac{dr}{\Delta r} \\
 &= \frac{f_{\infty} v}{3 c_s}
 \end{aligned} \tag{31}$$

a_d is the action between daons, whereas $\Delta r = \sqrt{\frac{8}{3}} r_d$ is the distance between shells. The C comes from the interaction between each daon and the three daons in the neighbouring shell, as indicated in figure 9.

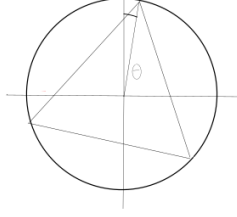


Figure 9: The geometry of the interaction, perpendicular to the electron radius, between each daon and the daons in a neighbouring shell.

$$C = \cos \eta \frac{1}{\pi} \int_0^\pi (\cos^2 \phi + \cos^2(\phi + \frac{2\pi}{3}) + \cos^2(\phi - \frac{2\pi}{3})) d\phi = \sqrt{\frac{3}{2}}$$

This is the medium action from three zones of contact between a daon and the daons in the next shell. η is the angle between the electron's radius and a line connecting the centres of two daons in interaction, belonging to neighbouring shells ($\cos \eta = \sqrt{\frac{2}{3}}$ since the geometry is a regular pyramid).

The external flux of free daons (v_{ϕ_2}) produce a force rotating the electron (see figure 8 b), the electron's velocity vector must therefore deviate in the sense of the rotation. This corresponds to the intrinsic force (31), multiplied with the angle of rotation, we get

$$F_M = \int_{r_e}^\infty \frac{f_n v_1 v_{\phi_2} (O^- - O^+)}{3 c_s^2} \frac{dr}{\Delta r} \quad (32)$$

+ indicates the outer shell, whereas the - indicates the inner shell.

Introducing the velocity from the source electron's circulating daons (see equation (29)), into equation (32) we get,

$$F_M = \frac{q_1 q_2}{e^2} \frac{f_\infty}{3} \frac{\vec{v}_1 \times \vec{v}_2 \times \vec{r}}{c_s^2} \frac{r_{e_\infty}^2}{r^3} \sin \theta_2 \quad r \gg r_{e_\infty} \quad (33)$$

θ_2 is the angle between the actual position of the source electron and the position of the target electron, relative to the velocity vector \vec{v}_2 .

The daons around the electron will change the direction of their rotational axis, with a value corresponding to the relative velocity between the electron

and the free daon flux, produced by the source electron. This modified angle will force the electron to rotate, where the rotation of the electron must correspond exactly to the rotation created by the daon flux.

Notice that, according to the definition of the direction of the magnetic field, the daons must be directed away from the electron's center, respectively towards the center for a positron.

Comparing this with the corresponding classical expression,

$$F_M = q_1 q_2 \frac{\mu_0}{4\pi} \frac{\vec{v}_1 \times \vec{v}_2 \times \vec{r}}{r^3}$$

there is perfect agreement, if the signal velocity is equal to the light speed,

$$c_s = \omega_d r_d = c \quad (34)$$

This means that **a daon's effective velocity of rotation is equal to the light speed** (it is of course the other way around).

The permeability becomes

$$\mu_0 = \frac{1}{\epsilon_0 c^2} \quad (35)$$

It should be noted that the electric force comes from the interaction between daons, expressed in equation (20), whereas the magnetic force originates from the transverse daon interaction, presented in equation (21).

4 Induction

An electron at constant speed (v), is rotating, producing a flux of daons around itself. This is due to the inclination of the daons, in the direction of the velocity as presented in figure 7. This inclination of the daons is exactly equal to a situation where the velocity of the electron relative to the free daons is replaced with the velocity of the free daons relative to the electron.

An electric field imposed on an electron will give a similar situation, where the inclination of the daons, in the direction parallel to the electric field lines (see figure 10), is identical to the inclination indicated above.

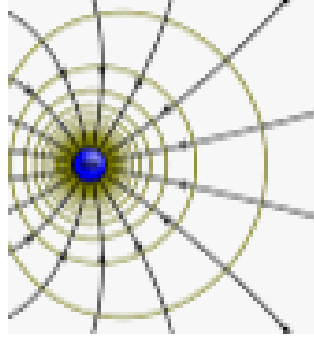


Figure 10: The inclination of the electric field lines.

Notice that the field lines in figure 10 corresponds exactly to the equipotential line (equi-order lines) of figure 7, if the electron corresponding to the figures has the same velocity (v)!

The daons axis of rotation is parallel with the electric field lines. If you impose an E-field, the field lines will bend in the direction opposite to the direction of the E-field (the direction of the electron daons rotational axis is opposite to the direction of the E-field), as you can see in the figure 10. We can then write, using equation (31), the electric field in the following way,

$$\vec{E} = \frac{f_\infty}{3} \frac{\vec{a}\Delta t}{c} = \frac{f_\infty}{3} \frac{\vec{a}\Delta r}{c^2} = \frac{\delta B}{\delta t} \Delta r \quad (36)$$

where $\Delta r = c\Delta t$ and a is the acceleration of the electron, in the direction of the electric field.

Which can be written as

$$\frac{\delta B}{\delta t} = \nabla \vec{E} \quad (37)$$

∇ means the differential operator (nabla).

This will cause the electron to rotate, producing an added magnetic field around the electron.

A better known induction law is

$$\int_{\Sigma} \frac{\delta B}{\delta t} = - \int_S E \quad (38)$$

where Σ is the surface inclosed by a coil and S is the circumference of the coil, as presented in figure 11.

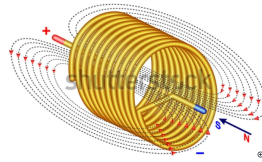


Figure 11: The magnetic flux through a coil.

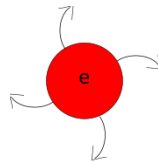


Figure 12: The inclination of the daons, in the sense perpendicular to the velocity of the electron.

In this case, we have the magnetic flux from the coil acting in the sense perpendicular to the electron's velocity. The daons surrounding the electron get an inclination in the transverse sense, as presented in figure 12, producing an acceleration in the direction of their substance rotation, i.e. an electric field. This gives the same relation as (37), besides the sign.

We have therefore that an electric field, imposed on an electron, produce a corresponding **positive** magnetic field, whereas an imposed magnetic field produce a corresponding **negative** electric field, i.e. we get a force resisting changes in the B-field, which is the specific characteristic of Induction.

We will add a more general consideration: The electric and magnetic action are directly coupled, you can't have one without the other. They have the same amount of energy, if you change one of them the other one will adapt so that the energy content is equal. If you take an electron at constant velocity (v) as example, you'll find the magnetic energy in the rotation of the electron and its surrounding daons whereas the electric energy is found in its mass increase.

You can't add energy through a pure magnetic action since the electron can absorb energy only through the electric field. So, in such a case, the electron's reaction is to re-adjust its energy content leading to the negative sign in the induction law.

5 The Electro-Magnetic wave

The Electro-Magnetic wave is, in principle, the transmission of an Electro-Magnetic signal through space. The source of sending and receiving, such a signal, is an antenna. A very simple antenna is a perfectly straight conductor, so thin that the transverse dimension can be neglected. An oscillating sinusoidal current is imposed, on such an antenna. The source of the EM-field is then the electrons oscillation, within the conductor.

But, how is it possible that the electrons within a wire can produce a magnetic field? The wire is neutral; there are an equal amount of positive and negative charges. So, why is a magnetic field produced when the daon flux comes from free daons? An electron should just adapt its velocity vector, relative to the free daon flux!

The answer is that a charge must always maintain its radial equilibrium so, if the electric field goes to zero, the radial equilibrium will be maintained by a reduction of **size**. The action of a daon is inverse proportional to its size so, a reduced size, relative to the size of the free daons (7), (11) , will create a corresponding order (**O**) to replace the electric field, which will maintain the force equilibrium around each individual charge in the wire. This then leads to a rotation of the daons, around the antenna.

5.1 Creation of the electromagnetic wave

We will here only examine the "far field" i.e., the "radiated" EM-wave. There is no electric field around the antenna since the wire is neutral, having equal number of positive and negative charges. It must therefore be the "flux" of free daons circulating around the antenna, coming from the acceleration/deceleration of the electron, which is the source of the radiation. We can express the velocity of the free daon flux, in the following way

$$v_\phi = a t O \quad (39)$$

$$= A \sin \omega t \frac{r_{e\infty}^2}{rc} \quad (40)$$

$$t = \frac{r}{c}$$

$$O = \frac{r_{e\infty}}{r^2}$$

It is the radial **variation of the velocity** of the free daon flux which is the source of the EM-wave. The oscillation of the daon flux, around the antenna, is the magnetic part of the EM-wave. What is missing is therefore the electric part, which can be found examining an individual daon, within the "cylindrical shells" of the daons movement around the antenna.

We should first recall how the daons are interacting between themselves, from equations (20) and (21) and the figure 2.

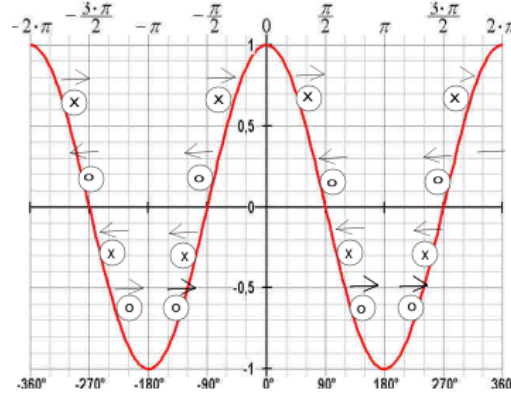


Figure 13: Phenomenon separating the daons due to the relative velocity (magnetic field) of the daons.

Depending on the orientation of its axis of rotation, a daon can be attracted or repelled or get an impulse in the direction parallel to the relative velocity \vec{v} , as demonstrated in figure 13. If a daon's axis is parallel to the movement of the daons, around the conductor, it will be pushed in the direction of the daon flux, according to equation (21). If its axis is perpendicular

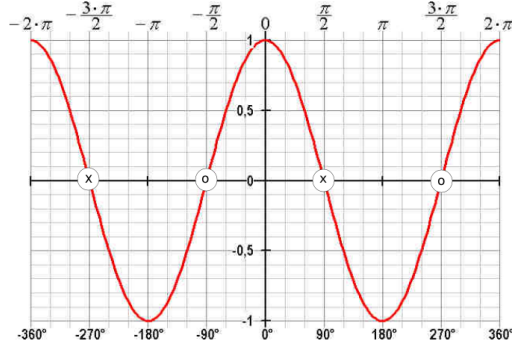


Figure 14: Phenomenon accelerating the daons (magnetic flux) due to the separation of the daons, with different axial direction.

to the direction of the surrounding daons movement, it will be pushed to or from the antenna, depending on the direction of its axis, relative to the direction of the electrons velocity, according to equation (20).

This phenomenon therefore separates and orders the daons, within the wavelength of the oscillation, which is exactly what we are looking for!

The order is separated, within the half period of oscillation, into two regions composed by daons having, in media, opposite directions of their rotational axis. It follows that the daons in between these two ordered regions, in the next half period, will obtain a velocity in a direction parallel to the shells and perpendicular to the electron's velocity vector, as schematically presented in figure 14.

This phenomena leads therefore to a sinusoidal behaviour, of both the order and the rotational velocity, of the daons but, displaced with $\frac{\pi}{2}$ radians in time and radial position, relative to each other. It means that the magnetic flux create an "electric order" corresponding perfectly to the magnetic one, which is the reason why an oscillation is produced, creating the electromagnetic wave, as you can see in figure 15.

If we examine an individual daon, we find that it is moving around the antenna, oscillating forward and backward, it has also a radial oscillation displaced with $\frac{\pi}{2}$ of a period.

The action-reaction, once produced, can *not* be lost in dissipation since the action-reaction between daons is without dissipation. So the electromagnetic wave must continue to expand away from the antenna in infinity, with the signal velocity c .

The electric and magnetic fields around the antenna, from one electron, can be written in a general manner as

$$B = \frac{f_{\infty} v_a}{3 c^2} \sin \omega t \quad (41)$$

$$E = \frac{f_{\infty}}{3} O_a \cos \omega t \quad (42)$$

v_a is the rotational velocity of the daons, around the antenna, whereas O_a is the Order of the same daons.

We obtain the magnetic field around an antenna as,

$$\vec{B} = \vec{v}_1 \times \frac{\mu_0}{4\pi c} \int \frac{\delta I}{\delta t} \vec{d}s \times \frac{\vec{r}}{r^2} \quad (43)$$

The corresponding electric field is created by the magnetic field and, since this is an interaction between free daons, there is no dissipation of energy i.e., the energy must be perfectly conserved. We therefore obtain,

$$\vec{E} = \frac{\mu_0}{4\pi} \left(\int \frac{\delta I}{\delta t} \vec{d}s \times \vec{r} \right) \times \frac{\vec{r}}{r^3} \quad (44)$$

Equations (43) and (44) are well known classical laws.

We also obtain, from the above, that the minimum wave length of an EM-wave must be bigger than some free daon radii, i.e. around $10^{-17}m$, while there is no upper limit.

Conclusion

We show, starting from general considerations, that a new theory of physics can be developed. We introduced a new unique object, called the **Daon**, it has specific, but rather simple, characteristics, it has only 3 parameters; its effective velocity of rotation (c), the radius of a free daon ($r_{d_{fd}} = 7.0 \cdot 10^{-19}m$) and "the associated daon mass" ($m_d = 1.0 \cdot 10^{-40}kg$). There is no freedom to match or adapt these values.

The Daon is proposed as the constituent of the electron and of its surrounding electromagnetic field. We found and expressed the value of the

dielectric constant and showed that the electric and the magnetic phenomena, can be explained as the daons collective behaviour. We examined the electron's internal equilibrium, as well as, its mass and Order.

We found that an important parameter is the electron's reference radius $r_{e\infty} = 1.1450 \cdot 10^{-15}$ which is fixed by the geometrical necessity for a radial equilibrium. We explain the reason for the signal speed c .

We explain the Induction and the Electro-Magnetic wave.

This simple and effective theory gives a detailed explanation to all fundamental electro-magnetic phenomena, as far as can be understood by the author.

Acknowledgment

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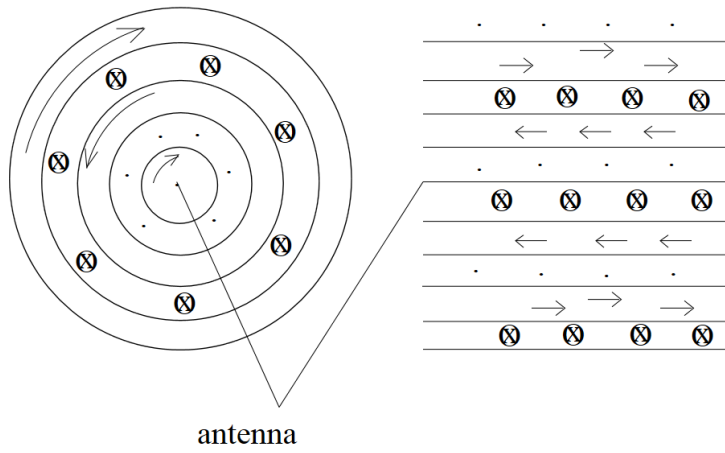


Figure 15: Phenomenon of EM-waves