**Slide 1**

**“Emission & Regeneration” Unified Field Theory.**

By Osvaldo Domann

In the first part of the video conference I will deal with the basic idea and the corresponding mathematical formulations of the “Emission & Regeneration” UFT approach.

In the second part I will show a new approach for the deduction of SR based on the findings of the E&R UFT, deduction that is free of time and space aberrations.

**Slide 2**

**Methodology.**

As a mathematical theory, physics should have a pyramidal shape, where few postulates at the top allow the deduction of all Known laws from top to bottom. Each law in the theoretical building, expressed as an equation, is deduced from equations that are placed at a higher level. The deduction of laws from equations that are placed at the same level or below is not allowed.

The present figure shows a schematic comparison between the methodology used in mainstream physics and the proposed approach.

Our standard theory starts formulating mathematically the basic laws for individual particles, namely, Coulomb, Ampere, Lorentz, Maxwell and Gravitation.

At a second level, thermodynamic laws are introduced with the help of state variables to describe assemblies of matter.

Then the particle’s wave is postulated (de Broglie) to explain the analogy between diffraction patterns obtained with electromagnetic rays and rays of particles. The particle’s wave allows the definition of differential equations of the wave function to describe mathematically the quantized behavior of particles in nature (Schroedinger).

Up to this point of the theory, no explanation is given about the origin of the forces and momenta measured between particles.

The efforts made to find explanations are:

* of experimental nature, scattering particles in particle accelerators and
* of theoretical nature, trying to infer interactions between fundamental particles postulating the invariance of wave equations under gauge transformations.

Proposed approach

The intention of the proposed approach is to explain what happens in the space between two charged particles or two masses that generates the forces we measure at the particles.

The methodology followed starts postulating fundamental particles based on the idea, that the energy of a particle is distributed in space and not concentrated at a point; that the energy is stored in fundamental particles that are emitted continuously from a focal point in space and to which regenerating fundamental particles continuously return.

FPs store the energy as rotations which are independent of coordinate systems and which define longitudinal and transversal angular momenta.

In a second step the interactions between FPs are postulated as interactions between their angular momenta, what is mathematically expressed as scalar and vector products.

Finally, the interaction laws between FPs are determined in a recursive process so that the fundamental laws of physics, namely, Coulomb, Ampere, Lorentz, Maxwell and Gravitation could be derived.

The methodology makes sure, that the approach is in accordance with experimental data.

**Slide 3**

**Particle representation**

The Standard or mainstream theoretical physics is a mathematical model based on a rude representation of particles. Particles are modeled as static, point-like and unstructured with the complete energy concentrated in one point of space.

Standard theoretical physics also models mathematically the main laws of physics like Coulomb, Ampere, Lorentz, etc. only for variables that move in a restricted validity range, independent of the deviations from experimental data outside the validity range.

The result is the impossibility of the Standard mathematical model to describe data obtained experimentally with variables outside the validity range of the model.

Solutions used to overcome these difficulties are to use analogies and to introduce virtual particles or waves with the required characteristics. Examples of virtual particles introduced are gluons, bosons, quarks, gravitons, dark matter, dark energy, etc. and of a virtual wave is the de Broglie particle-wave.

To get a more realistic model for physical laws, the present approach introduces a more complex mathematical model for particles which is dynamic, distributed in space and structured. The approach introduces only one virtual particle with characteristics that are so defined that they allow the deduction of equations that match with the main physical laws like Coulomb, Ampere, Lorentz, etc. for variables moving in their validity ranges and analyses then how good the equations also match with experimentally obtained data with variables that are outside the validity ranges of the main physical laws.

The slide shows the standard representation of a particle and the representation of the present approach.

A Basic Subatomic Particle (BSP) (electron or positron) in the present approach is represented by a focal point in space from which Fundamental Particles (FPs) are emitted and to which regenerating FPs return. The relativistic energy of a BSP is distributed on its FPs as rotations which define the longitudinal angular momenta Je for the emitted FPs and the longitudinal and transversal angular momenta Js, and Jn for the regenerating FPs respectively.

Transversal angular momenta Jn are generated when the particle moves the same as for the magnetic field H of the standard model. The main difference is that for the new model the direction of the transversal angular momenta is defined only by the right screw in the direction of the speed, while the standard model additionally differentiates between the sign of the charge of the particles.

The sign of the charge of a particle is defined in the new model by the rotation sense of the longitudinal angular momentum of the emitted FPs, positive for rotations in the direction of the right screw in moving direction.

**Slide 4**

**Characteristics of the introduced fundamental particles (FPs)**

* Fundamental Particles are postulated.
* FPs move with light speed and with nearly infinite speed.
* FPs store energy as rotations in moving and transversal directions.
* FPs interact through their angular momentum.
* Pairs of FPs with opposed transversal angular momentum generate

linear momentum on *subatomic particles*.

**Classification of Subatomic Particles (SPs).**

* Basic Subatomic Particles (BSPs) are the positrons, the electrons and the neutrinos.
* Complex Subatomic Particles (CSPs) are the proton, the neutron, nuclei of atoms and the photon.

**Slide 5**

**Classification of electrons and positrons**

When formulating and resolving the equations for the emission and regeneration of FPs, the following results were obtained:

FPs move with light peed or with nearly infinite speed. The combination of the speeds results in two types of BSPs, namely, accelerating and decelerating BSPs. The designations are based on the comparison of the velocities of regenerating and emitted FPs. The longitudinal momenta of the emitted and regenerating FPs have always opposed signs. . There are accelerating electrons and decelerating electrons; the same for the positrons.

FPs are emitted by BSPs and regenerate them. The sign of the longitudinal angular momenta of the emitted FPs define the charge of a BSP

Electrons and positrons can be seen as focal points in space where FPs cross changing their speeds and their signs of the longitudinal angular momenta.

**Slide 6**

**Distribution in space of the relativistiv energy of a BSP with v c**



The fundamental idea of the proposed approach is that the energy of a particle is distributed in space and not concentrated at one point as postulated by standard theory.

This page presents the mathematical formulations of the distribution in space of the relativistic energy of an electron or positron.

At the left, the relativistic energy ***Ee*** is expressedas the square root of the square rest energy and the square kinetic energy ***Ep***.

At the right the same relativistic energy ***Ee*** is presented as the sum of two terms “***Es***” and “***En***”, terms that are assigned to the angular momenta of the regenerating FPs which respectively rotate in longitudinal and transversal directions.

The figure shows a BSP moving with the speed “v” and an associated FP with the longitudinal unit vector “***se***” for emitted FPs, and the longitudinal unit vector “***s***” and the transversal unit vector “***n***” for regenerating FPs. The density of FPs is symmetric around the velocity axis of the BSP.

Differential energies ***dEe***, ***dEs*** and ***dEn*** are defined for the FPs with the help of a distribution function ***dk*** which gives the part of the total energy contained in the corresponding differential volume ***dV***. The corresponding angular momentums ***J*** are introduced.

The distribution function ***dk*** follows the radiation law and is inverse proportional to the square distance.

Probability is inherent to the model with the distribution function ***dk*** defining the probability to find a FP in the differential volume ***dV***.

Emitted FPs only rotate in moving direction. Positrons emit FPs that rotate clockwise and electrons emit FPs that rotate counterclockwise.

Regenerating FPs have rotations in moving and transversal directions.

The model is dynamic in that BSPs emit FPs and are regenerated by them.

**Slide 7**

**Energy flux density and Energy density**

The figure shows an electron moving with speed “***v***”. For the area ***dA*** we get an energy flux density ***dSi*** and for the volume ***dV*** an energy density ***w***. At each point in space we have energy densities ***wi*** for the two types of FPs, namely, the emitted and regenerating FPs.

The energy densities have radial symmetry.

**Slide 8**

**Linear momentum out of opposed angular momentum**

We have seen that a moving BSP has part of its energy stored in transversal angular momenta which have a rotational symmetry around the velocity axis of the BSP. (see slide 5)

In a plane perpendicular to the velocity vector of the BSP each transversal angular momentum has its opposed complying with the momentum conservation law.

If the energy of a BSP is stored in rotational movement a mechanism must exist that transforms rotations into linear movements.

The slide shows the plane that contains the speed vector **v** with the energies ***dE*** associated with the opposed transversal angular momenta.

Similar to what is observed in our atmosphere between cyclones and anticyclones a mathematical expression was adopted to transform energy stored in rotations to the linear relativistic kinetic energy of a BSP. The mathematical expression is given by the line integration along a close path.

**Slide 9**

**Moving particles with their angular momenta**

Moving electrons/positrons emit FPs with longitudinal angular momentua *Je* and are regenerated by longitudinal angular momentua ***Js*** and transversal angular momenta ***Jn***. Opposed pairs of transversal angular momenta generate elementary linear momenta ***pelem***

The photon is a sequence of opposed angular momenta ***h*** that generates alternated linear momenta giving the photon the wave character. ***h*** represents the Planck constant which has the dimension of angular momentum.

The neutrino consists of one pair of opposed angular momenta ***h*** and its potential linear momentum can have any direction in space.

Photons and neutrinos move with light speed relative to the emitting source.

The differential energies of FPs in space can be expressed as having all a common angular momentum ***h*** and variable angular frequencies, or vice versa.

**Slide 10**

**Fundamental differences in the representation**

**of particles compared with standard theory**

**Slide 11**

**Definition of field magnitudes d*H***

What we measure at BSPs are variations of momenta in time, namely forces. The momentum of a moving BSP is given by its relativistic kinetic energy ***Ep.***

The interactions between FPs are defined in the proposed approach as interactions between their angular momenta which are mathematically expressed as scalar and vector products.

To get the dimension of energy out of a scalar or vector product it is necessary that the factors have the dimensions of square root of energy. That is the reason why the ***dH*** field is introduced as the square root of the previously defined energies.

The page shows the definitions for the longitudinal emitted field ***dHe***, the longitudinal regenerating field ***dHs*** and for the transversal regenerating field ***dHn***.

Also the relations between the angular momenta ***J*** of FPs and the ***dH*** fields are shown.

**Slide 12**

**Time quantification**

Until now the analysis that was made had concentrated on single moving particles. The analysis of interactions between two particles shows that the time ***Delta t*** for the variation of each linear momentum of the sequence of linear momenta which generates the force is quantized.

The time ***Delta t*** is proportional to the radii of the focal points which are invers proportional to the energy of the particles. The proportionality factor ***K*** is a universal constant.

The equations for the radii of focal points of BSPs are shown. For speeds smaller than the light speed the relativistic energy must be used. For speeds equal the light speed the energy of a photon must be used.

**Slide 13**

**Interaction laws for field componenets *dH for* two BSPs**

The following interaction laws are presented in what follows.

1) Interaction law between two static BSPs (Coulomb)

2) Interaction law between two moving BSPs (Ampere, Lorentz, Bragg)

3) Interaction law between a static and a moving BSP ( Maxwell, Gravitation)

**Differential energy generated by the interaction of two *dH* fields.**

For each of the interaction laws the corresponding ***dH*** fields must be used to get the energy ***dE***.

Two static BSPs interact through their longitudinal ***dHs*** fields.

Two moving BSPs interact through their transversal ***dHn*** fields.

A moving and a static BSP interact through their longitudinal ***dHs*** and transversal ***dHn*** fields respectively.

**Slide 14**

1. **Interaction law between two static BSPs (Coulomb)**

The figure shows two BSPs 1 and 2 and how the differential momentum ***dp*** is generated at BSP 2 by BSP 1.

BSP 1 emits FPs with longitudinal angular momenta ***Je1*** which interact with the regenerating longitudinal angular momenta ***Js2*** of BSP 2. The interaction is given by the vector product of the angular momenta which results in the transversal angular momentum ***Jn2***.

Because of the symmetry of emitted and regenerating FPs an opposed angular momentum

- ***Jn2*** is generated. The pair of opposed angular momenta generates the linear momentum ***dp*** when they arrive at the focal point of BSP 2.

The equations show the relations between the angular momentua ***J***, the ***dH*** field, the kinetic energy ***Ep*** and the linear momentum ***dp***.

At the figure the BSPs that provide the regenerating FPs for BSP 2 are shown. These BSPs provide the frame for the two interacting BSPs 1 and 2.

The equation to calculate the momentum ***dp*** generated by a closed loop is shown. To get the total linear momentum ***p*** the integration over the whole space is required.

**Slide 15**

1. **Interaction law between two moving BSPs**

The interaction between two moving BSPs takes place between the transversal angular momenta of FPs of the two BSPs. The interaction is mathematically described as vector product between the transversal ***dHn*** fields generated by the transversal angular momenta ***Jn***.

The interaction generates opposed angular momenta that generate opposed linear momenta at the two BSPs.

The direction of the opposed angular momenta depend on the charge of the BSPs and on the directions of the moving BSPs.

The equations to calculate the momentum between two moving BSPs are similar to the equations for two static BSPs, only that the longitudinal fields ***dHs*** are replaced by the transversal fields ***dHn***.

The equation describes the Ampere force, the Lorentz force and the bending force of an electron when shot through a crystal.

**Slide 16**

1. **Interaction law between a static and a moving BSP.**

The interaction law between the FPs of a moving and a static BSP is called the ***induction law***.

A moving BSP generates a transversal ***dHn*** field with opposed components. The static BSP or probe BSP filters out with its regenerating FPs the opposed components of the ***dHn*** field which then generate on it a linear momentum. The opposed ***dHn*** components which have passed from the moving to the static BSP are now missing at the moving BSP which originally had a balanced symmetric configuration. The produced unbalance on the moving BSP generates the opposed linear momentum on the moving BSP complying with the conservation law.

The differential linear momentum generated on the probe BSP is given by the close loop integral of the product of the transversal field ***dHn*** of the moving BSP and the longitudinal regenerating ***dHs*** field of the static BSP.

To get the total linear momentum on the static BSP the integration over the whole space is required.

**Slide 17**

**Charge and current of CSPs**

In the present approach the elementary charge is replaced by the energy (or mass) of a resting electron . The charge of a Complex Subatomic Particle (e.g. proton) is given by the difference between the **constituent** numbers of BSPs with positive  and negative  that integrate the CSP, multiplied by the energy of a resting electron.

As examples we have for the proton with  and  and a binding energy of  a charge of , and for the neutron with  and  and a binding energy of  a charge of .

The unit of the charge thus is the Joule (or kg). The conversion from the electric current  in Ampere to the mass current  in kg/s is given by

 (5)

with  the electron mass in kilogram and  the elementary charge in Coulomb.

**Slide 18**

**Fundamental differences in the representation of interactions between BSPs and CSPs compared with standard theory.**

**Slide 19**

**Linear momentum p(stat) as a function of the distance between two static BSPs.**

The curve shows the solution of the differential equation for the total momentum p(stat) where the following zones can be identified:

**Zone 1) from 0<= gama <= 0.1**

This is the zone where electrons and positrons coexist without repelling or attracting each other. The force between them is zero and no strong forces or gluons are required to hold them together.

**Zone 2) from 0.1 <= gama <= 1.8**

This is the zone where electrons and positrons from zone 1 migrate and are then reintegrated to zone 1 or expelled with high speed when their FPs cross with FPs of the remaining BSPs in zone 1. At stable nuclei all migrated electrons and positrons are reintegrated to zone 1 while at unstable nuclei part of them are expelled. The process of reintegration and expulsion is a probabilistic process because it depends on the probability that FPs of the migrated BSPs cross with FPs of the remaining BSPs in zone 1.

No special weak force is required to explain radioactivity of nuclei.

**Zone 3) from 1.8 <= gama <= 2.1**

At this part the curve is nearly constant and it gives the width of the energy barrier for electrons and positrons.

**Zone 4) from 2.1 <= gama <= 518**

At this zone the momentum between the two BSPs falls with the inverse distance.

**Zone 5) from 518 <= gama <= **

This is the zone where the Coulomb law is valid.

A calculation example gives for gamma 518 and for a Carbon 12 nucleus a distance ***d*** of 9.0724 *fm.*

**Slide 20**

**Diffraction of BSPs at a Crystal due to reintegration of BSPs**

The figure shows an electron moving between two nuclei composed of BSPs.

Each nucleus has migrated BSPs in all directions that are reintegrated continuously. All reintegrating BSPs of a nucleus that move parallel to the moving electron can interact with it according the Ampere law of parallel currents. The energy exchange between the two parallel moving BSPs is quantized in the energy of a resting Electron. The deviation of the electron from its straight path is therefore quantized in steps ***m*** according to the difference between the numbers of unbalanced parallel reintegrating BSPs ***Delta m*** at each nucleus.

**Slide 21**

**Gravitation between two neutrons due to parallel reintegration of BSPs**

The figure shows two neutrons with migrated BSPs which are reintegrated perpendicular to the distance ***d*** between them. At each neutron the reintegrating BSPs generate the current ***im.***

Parallel currents generate an attractive or repulsive force ***FR*** between the neutrons according the signs of the currents.

Because of the power exchange with infinite speed between the neutrons the reintegrating currents are synchronized resulting in an attracting force.

The number of parallel currents between two bodies is proportional to the product of the number of Complex Subatomic Particles of each body, hence proportional to the product of their masses.

The force between parallel currents is inverse proportional to the distance and explains the flattening of the galaxies´ rotation curve without the need of dark matter.

It is to note, that the synchronization of the parallel currents can also produce a repulsive force if the currents have opposed directions. MS physics introduces the virtual dark energy to explain the repulsion force between matter.

A first approximation gives for the proportionality factor the value of 6.05 10-27 newton-meter/ square kg.

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**Gravitation between two neutrons due to aligned reintegration of BSPs (Newton law)**

The figure shows how the momentum of a reintegrating BSP of neutron 1 is passed to neutron 2.

When FPs of the migrated BSP of neutron 1 interact with FPs of one of the remaining BSPs in neutron 1 of opposed sign, then the migrated BSP is reintegrated to neutron 1. During the reintegration a transversal field dHn is generated which is captured by regenerating FPs of a BSP at neutron 2. The linear momentum of the reintegrating BSP is passed to neutron 2 while Neutron 1 remains with the opposed linear momentum of its previous partner.

At stable nuclei migrated BSPs that interact with BSPs of same sign don’t get the necessary energy to pass the potential barrier.

At unstable nuclei some of the migrated BSPs that interact with BSPs of the same sign get the necessary energy to be expelled.

At the figure the momentum curve of two static BSPs is shown as reference. BSPs that are in the core of Neutron 1 don’t attract nor repel each other. Migrated BSPs are in the zone of the curve where the momentum grows proportional to the square distance.

As the probability that FPs of neutron 1 cross with FPs of neutron 2 is inverse proportional to the product of the distances to their neutrons, the gravitation force is inverse proportional to the square distance between the neutrons.

The gravitation force is also proportional to the product of the number of BSPs of each body (mass) because each BSP of one body exchanges the same energy with each BSP of the other body and vice versa.

**Slide 23**

**Total gravitation force**

The total gravitation force is given by the gravitation force due to the induction law and the gravitation force due to the Ampere law.

For sub galactic distances the gravitation due to the induction law is predominant while for galactic distances the gravitation due to the Ampere law predominates.

The second term of the total gravitation equation explains the flattening of the galaxies´ rotation curve without the need to define the existence of dark matter.

Still to investigate is, if the second term also explains the perihelion precession of Mercury.

**Slide 24**

**Linear momentum balance between static and moving BSPs**

The figure shows how the momentum of a moving BSP is passed to a static BSP for the case of an elastic collision of particles.

Particle ***1*** is moving with the momentum ***p1*** and the kinetic energy is stored in the transversal field ***dHn***. Particle ***2*** is static with the resting energy stored in the regenerating ***dHs*** field. During the approximation of BSP ***1*** to BSP ***2*** the regenerating FPs of BSP ***2*** collect opposed components of the transversal field ***dHn*** of BSP ***1*** until the whole ***dHn*** field is passed to BSP ***2***.

During the approximation, BSP ***1*** gives continuously away its ***dHn*** field and loses momentum which is passed to BSP ***2*,** which finally ends with the ***dHn*** field that originally belonged to BSP ***1***.

For the case of a semi-elastic collision, pairs of opposed ***dHn*** will fail in regenerating the BSPs because of the hard change of velocity of the BSPs and become independent as neutrinos or photons.

If we compare with the movement of a charged particle we find the following differences:

* The direction of the magnetic field ***H*** of standard theory depends on the charge of the particle, while the direction of the transversal field ***dHn*** of the present approach is independent of the charge and follows always the right-hand cork-screw rule in moving direction.
* Standard theory defines the force on a moving charge due to an external magnetic field as an interaction between the charge and the external magnetic field, while the present approach defines the force as the interaction between ***FPs*** of two moving charges taking into account that the external magnetic field is generated by moving charges.
* The transversal ***H*** field from standard theory explains only the magnetic properties of moving charged particles, while the transversal field ***dHn*** of the present approach explains the magnetic and the inertial properties of moving particles.
* Inertia is the result of the time delay of the interaction between two particles, namely the time required by the FPs from the emission at the first BSP until the meeting in space with the regenerating FPs of the second BSP and the time until the regeneration of the second BSP. The Newton equation expresses the time delay as the time variation of the speed, while the mass is simply a proportionality factor. No Higgs particles are required to explain inertia.

**Slide 25**

**Power flow between charged bodies**

Momentum is transmitted between BSPs with light or infinite speed.

The upper part of the drawing shows the power flow between two BSPs with light speed.

The power flow between the two particles is in a dynamic equilibrium.

The lower part of the drawing shows the power flow between two charged Complex Subatomic Particles which results in the measurable momentum. The power flow between the other BSPs of the two CSPs produces no measurable momentum because they compensate.

The positron from the CSP 1 exchanges the same power with each electron of the CSP 2.

**Slide 26**

**Mechanism of permanent magnetism**

We have seen that at atomic nuclei migrated electrons and positrons are constantly reintegrated to their nuclei. The simultaneous aligned reintegration of an electron and a positron that are at the opposed sides of a nucleus gives a resulting current ***im***.

If we now imagine a configuration as shown, where along a closed line of nuclei electrons and positrons are synchronically reintegrated in the same direction giving a closed current ***im,*** a ***dH*** fieldwill be generated through the area defined by the closed line.

When a growing external magnetic field is applied to a ferromagnetic material, the induced voltage along the closed line polarizes the migration of electrons and positrons out of their nuclei which results also in a polarization of the reintegration of the migrated BSPs along the closed line. The interactions between reintegrated BSPs at adjacent nuclei produce a synchronization of the reintegration along the closed line resulting in a closed current, synchronization that remains also when the external field stops growing.

Materials that remain magnetized have the capacity to hold the synchronization of the reintegration of electrons and positrons along a closed line of nuclei when the external magnetic field is slowly reduced to zero. (remanence magnetism).

**Slide 27**

**Quantification of force**

Based on the time quantification introduced in the previous slide, all forces measured between particles can be expressed as a product of a number ***N,***  the elementary momentum ***p****elem* and the frequency ***nuo*** of the elementary momentum. The force thus can be seen as a shower of FPs with opposed angular momentum that hits a particle, shower that is proportional to the number ***N*** of FPs of the two BSPs that meet in space during the time ***Delta t***.

The slide shows the equations to calculate the number ***N*** for the Coulomb force, the Ampere force and the gravitation force with its induction and ampere components.

**Slide 28**

**Neutron and proton composed of accelerating positrons and decelerating electrons**

The proposed approach defines two types of electrons and two types of positrons denominated accelerating and decelerating according to the two possible regenerating and emitting speeds of the FPs.

Decelerating electrons provide the FPs which are required to regenerate accelerating positrons and vice versa. They build a closed system.

Accelerating electrons provide the FPs which are required to regenerate decelerating positrons and vice versa. They build also a closed system.

The figure shows at ***a)*** a neutron without migrated BSPs composed of 919 accelerating positrons and of 919 decelerating electrons. Positrons provide the necessary number and type of FPs to regenerate the electrons and vice versa.

At ***b)*** a proton without migrated BSPs is shown with 919 accelerating positrons and of 918 decelerating electrons. Because of the missing electron there is an excess of FPs with positive angular momentum and infinite speed and a lack of FPs with negative angular momentum and light speed. FPs which are in excess are emitted and interact with a level electron of the same type as the electrons of the proton. FPs which are lacking are provided by the level electron.

**Slide 29**

**Spin of level electrons**

The definition of two types of electrons and positrons has let to protons that are formed of BSPs that complement each other and which are of two types:

* Protons formed of accelerating positrons and decelerating electrons and
* Protons formed of decelerating positrons and accelerating electrons

The slide shows a Hydrogen proton with an accelerating positron in excess and the associated decelerating level electron.

The slide also shows the following element in the Periodic Table, namely the Helium atom with the second proton of the other type compared with the Hydrogen atom. The second proton has decelerating positrons and accelerating electrons.

The level electron associated to a proton is of the same type as the electrons of the proton.

In our standard theory the elements of the Periodic Table are classified according to the growing number of protons in their nuclei and with level electrons that alternate their spin.

In the present approach the elements of the periodic table are built with alternating types of protons, and with level electrons that alternate between accelerating and decelerating electrons.

**Slide 30**

**Stern-Gerlach experiment an the spin of the electron**

Introduction

In the Stern-Gerlach experiment neutral particles are shot through a strong inhomogeneous magnetic field and the observed deflections are attributed by standard theory to the magnetic angular momentum of the external unpaired electron.

To introduce the spin of an electron the assumption is made, that at the Ag atom for instance, 46 of the electrons form together with the nucleus a close inner core of total angular momentum zero and that the one remaining electron has no orbital angular momentum. This would mean that the remaining level electron is static without the possibility to compensate with its centrifugal force the attracting force of the nucleus and will collapse.

Another argument against the spin of an electron is that all theoretical efforts made to explain the magnetic moment of an electron as a rotating charge have let to absurd conclusions.

Stern-Gerlach experiments with charged particles are not possible because of the strong Lorentz force which makes impossible to verify the spin and associated magnetic momentum of an isolated electron.

The proposed approach

In the proposed approach there are two types of electrons and positrons that replace the spin to explain the two different states electrons take in energy levels of atoms. It remains the question how to explain the deflections of neutral particles in the Stern-Gerlach experiment.

In the proposed approach, the deflections are attributed to the interactions between the two parallel currents of BSPs, namely, the currents that generate the external magnetic inhomogeneous field and the currents due to reintegration of BSPs at the nuclei of the neutral particles of the atomic ray. The interactions between parallel currents of BSPs are quantized in energy quanta equal to the rest energy of an electron, what explains the quantization of the deflections of the atoms of the ray.

The figure shows at **a)** the forces which appear individually or combined depending on how many reintegrating BSPs interact simultaneously with the currents ***I1*** that produce the external inhomogeneous magnetic field.

At **b)** which is a top view of ***a)*** the reintegrating currents ***im*** of the atomic nucleus and the resulting forces ***Fb*** are shown.

At ***c)*** a sequential Stern-Gerlach experiment is shown where the particles ***+Z*** from

***SG1*** are passed through ***SG2*** with the result that all particles are of the type ***+Z*** with no particles of the type ***–Z*** . To obtain the mentioned result a homogeneous magnetic field ***Hz*** must be applied between ***SG1*** and ***SG2***.

The explanation given by our standard theory to the need of the homogeneous magnetic field ***Hz*** is, that the magnetic momentum of the valence electron must be maintained unchanged during the pass from ***SG1*** to ***SG2***.

The proposed approach explains the up or down deflections with the special combinations of the interacting currents ***I1*** and ***im*** which are defined by the special configurations the orbital electrons and reintegrating BSPs take when the atom enters the external inhomogeneous magnetic field. To have the same combination of interacting currents with the same deflection at *SG2* it is necessary to maintain the configuration of the orbital electrons and reintegrating BSPs of the atoms with the help of the homogeneous magnetic field ***Hz*** between the two ***SG*** devices.

The proposed approach concludes that the deflections are a characteristic only of complex particles like the neutrons, protons, and atoms and not a characteristic of BSPs like electrons, positrons and neutrinos.

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**Special Relativity**

Photons are sequences of pairs of FPs with opposed ***dHn*** fields that define potential linear momenta.

Photons that are emitted by a coordinate system that moves with the speed ***u*** relative to a second coordinate system will arrive at the second system with the speed ***c +- u***.

At the picture one constituent of a photon (opposed field ***dHn***) is shown just before being absorbed by an electron of the second coordinate system transferring its potential linear momentum ***dp\_r*** . The now moving electron in the second coordinate system generates new opposed transversal fields ***dH\_n*** which are irradiated with the speed of light in the second system when the electron is stopped after a distance ***Delta x*** because of its bindings to an atom. The Light that we measure is first absorbed by level electrons of our instrument (glass of the optical system, electronic system, etc.) and subsequently emitted with light speed relative to the instrument, what explains why we always measure light speed.

**Slide 32**

**Life time increase of moving radioactive particles**

On the figure the static momentum curve ***pstat***between two BSPs is shown, curve that becomes the Coulomb curve for distances ***d*** much greater than the radius of the CSP.

A muon is composed of nucleons which are composed of electrons and positrons which, when they move, generate transversal ***dHn*** fields.

Electrons and positrons that migrate outside the radius of their nucleons and which interact respectively with the remaining electrons and positrons are accelerated away from their nucleons. Because of the transversal ***dHn*** field they are now forced by the Lorentz force into a circular path what reduces the probability that they cross the potential barrier of the static field, increasing correspondingly the life time of the muon.

The increase of the life time of moving radiating particles is the result of the interactions of the FPs of the moving particles with FPs of external bodies like the atmosphere and the measuring equipment which provide the regenerating FPs to the moving particles defining the reference frame.

**Slide 33**

**LT frames. Space-time variables**

The slide shows the inertial frames and the general Lorentz equations when formulated with space-time variables as done by Einstein. When the general Lorentz transformation for orthogonal coordinates is applied we get the general Lorentz transformation rules which present time dilatation and length contraction between the frames. For the special case that the frames move only along one of the orthogonal coordinate axis we get the special transformation rules of Special Relativity.

The factor ***gamma*** is a product of the geometric relations defined by the Lorentz transformation, independent of the variables used in the Lorentz equation.

**Slide 34**

**LT frames. Speed variables**

The slide shows the inertial frames and the general Lorentz equations that result when speed variables are introduced dividing both sides of the space-time formulation with the same time increment (***Dt)2*** postulating that time is the same in all frames.

The Lorentz transformation based on speed variables is based on the following findings of the present approach:

1. That light is emitted relative to the emitting source with light speed ***c***.
2. That it arrives with the speed ***c+-v*** at a second frame that moves with the speed v relative to the first one.
3. That light that arrives with the speed ***c+-v*** to optical lenses or electric antennae is absorbed and subsequently emitted with light speed ***c*** relative to the frame of the measuring instruments, what explains why always light speed ***c*** is measured in all frames.

The additional frame ***K\**** (star) shown on the slide is a frame that is fixed to the frame ***K-*** (dash) to account of the finding that light that arrives with the speed ***c+-v*** from the frame ***K-*** (dash) to optical lenses or electric antennae in frame ***K\**** (star) is absorbed and subsequently emitted with light speed ***c*** relative to the frame of the measuring instruments.

There is no space contraction between the frames ***K*** and ***K-*** what means that the wave length remains constant when light moves between these frames.

The resulting Lorentz transformation rules are exclusively between speeds and consequently no time dilatation or length contraction are present.

**Slide 35**

**Relativistic equations**

The slide shows the main relativistic equation derived with the Lorentz transformation based on speed variables.

All equations are the same as for the Lorentz transformation based on time-sped variables except that the transversal Doppler Effect doesn’t exist and that the Charge and Current densities are equal for all frames.

**Slide 36**

**Characteristics of the special LT based on speed variables**

**Slide 37**

**Quantum mechanics**

**The focal radius**

Standard theory postulates the particle’s wave (de Broglie) to explain the analogy between diffraction patterns obtained with electromagnetic rays and rays of particles. The particle’s wave length allows the definition of differential equations of the wave function to describe mathematically the quantized behavior of particles in nature (Schroedinger).

In the proposed approach an equation for the radius of the focal point of a BSP is obtained when calculating the far field of an oscillating BSP. The equation is similar to the de Broglie equation to calculate the wavelength except, that it is inverse proportional to the total energy, instead of only the momentum of a particle. The focal radius of a BSP doesn’t tend to infinite with the speed tending to zero as is the case for the de Broglie wavelength.

The focal radius replaces effectively the particle´s wave length in all theoretical models where the particle´s wave is used to explain the observed or measured processes.

**The uncertainty principle**

If the focal radius is used to form the wave packet the uncertainty relations form pairs of canonical conjugated variables between "energy and space" and "momentum and time".

**The differential equation for the wave function**

With the focal radius of a particle a differential equation for the wave function is obtained where the wave function is derived one time towards space and two times towards time.

If compared with the Newton differential equation for an accelerated particle, the new differential equation for the wave function has the same structure, what makes quantum mechanics more comprehensible.

The Schrödinger equation results as a particular time independent case of the wave packet.

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**The Hydrogen Atom**

The solution for the hydrogen atom of the proposed differential equation gives energy eigenvalues ***Ek*** that are equal to a negative term of the series of the hydrogen spectrum empirically introduced by Ballmer minus the energy of a resting electron. The hydrogen spectrum thus results as the negative difference between the energy eigenvalues ***Ek*** which are functions respectively of the principal and orbital quantum numbers ***n*** and **l**.

The slide shows the energy eigenvalues ***Ek*** for a constant orbital quantum number ***l=1*** and variable principal quantum number ***n.***

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This slide shows the orbital radius for a constant orbital quantum number ***l=1*** and increasing principal quantum number ***n***  which means increasing eigenvalues ***Ek.*** The orbital radius decreases.

The slide also shows the orbital radius for a constant principal quantum number ***n=11*** which means constant energy eigenvalue ***Ek.*** For an increasing orbital quantum number ***l*** the orbital radius increases.

The relation deduced between the magnetic and orbital quantum numbers requires that the absolute magnetic quantum number is always smaller or equal to the absolute orbital quantum number.

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**Findings of the proposed approach**

The main findings of the proposed model, from which the present presentation is an extract, are:

• The energy of a BSP is stored in the longitudinal rotation of emitted fundamental particles. The rotation sense of the longitudinal angular momentum of emitted fundamental particles defines the sign of the charge of the BSP.

• All the basic laws of physics (Coulomb, Ampere, Lorentz, Maxwell, Gravitation, bending of particles and interference of photons, Bragg) are derived from one vector field generated by the longitudinal and transversal angular momentum of fundamental particles, laws that in today's theoretical physics are introduced by separate definitions.

• The interacting particles (force carriers) for all types of interactions (electromagnetic, strong, weak, gravitation) are the FPs with their longitudinal and transversal angular momentums.

• Quantification and probability are inherent to the approach.

• The incremental time to generate the force out of linear momentums is quantized.

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• The emitted and regenerating energies of a BSP are quantized in energy quanta equal to the energy of a resting electron.

• Gravitation has its origin in the momentum generated when BSPs that have migrated outside the nucleons are reintegrated.

• The gravitation force is composed of an induced component and a component due to parallel currents of reintegrating BSPs. For galactic distances the induced component can be neglected what explains the flattening of galaxies´ rotation curve. (no dark matter).

• The photon is a sequence of BSPs with potentially opposed transversal linear momentums, which are generated by transversal angular momentums of FPs that comply with specific symmetry conditions.

  • The two possible states of an electron that are explained as spin are replaced by the two types of electrons defined by the present theory, namely the accelerating and decelerating electrons.

• The magnetic moment as the responsible for the splitting of the atomic beam in the Stern-Gerlach experiment is replaced by the quantized interacting of parallel currents.

• Permanent magnets are explained with the energy flow between static BSPs that form a closed ring.

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• The addition of a wave to a particle (de Broglie) is effectively replaced by a relation between the particles radius and its energy. Deflection of particles such as the electron is now a result of the quantified bending linear momentums between BSPs.

• The uncertainty relation of quantum mechanics form pairs of canonical conjugated variables between "energy and space" and "momentum and time".

The Schrödinger equation results as the particular time independent case of a more general wave differential equation where the wave function is differentiated two times towards time and one towards space.

• The new quantum mechanics theory, based on wave functions derived from the radius-energy relation, is in accordance with the older quantum mechanics theory based on the correspondence principle.

• The proposed approach has no energy violation in a virtual process at a vertex of a Feynman diagram.

• As the model relies on BSPs permitting the transmission of linear momentums at infinite speed via FPs, it is possible to explain that entangled photons show no time delay when they change their state.

• Special relativity based on speed variables are free of time and length corrections. Life time of radiating particles increase at moving particles because of the interactions of FPs and not because of time dilatation.

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**The End**