Particles, waves and trends in physics.

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Abstract

Speeds of electrons and protons in atoms are small. For example: An electron moving at a speed $\mathbf{v_e = 0{,}003c}$ creates spectral line **Hα.** Accurate electron speeds are given in the table in this article. Confirmation of Doppler´s principle in hydrogen for Balmer line **Hα.**
Comparison the official and of the author´s results.
Theory of particles, waves and heat. Accompanying activity of reaction on movement of stable particles in the transmission medium are waves.
Neutron, β electron , gamma rays – calculations. Discussion to Cobalt-60 decay.
Stable **electrons** moving with speeds (**0,99 c – c)** creates leptons (**μ−, τ−**), neutrinos (**νe, νμ, ντ**) and bosons **W +, W-, Z** (= **β** electrons). Weak interactions are caused with stable **electrons,** which creates leptons (**μ−, τ−**) = (particles = electrons different speeds), neutrinos **νe, νμ, ντ** (= waves) , bosons **W +, W-, Z** (= particles = **β** electrons moving at nearly the speed of light) and **gamma rays (**=waves of extremely high frequency $>10^{19}$ Hz).
Stable particles (**p +, n0, D, He-3, α**) moving with speeds (**0,3 c – 0,99 c)** creates baryons and mesons.
The strong interactions are caused with stable particles (**p +, n0, D, He-3, α**), which creates baryons and mesons. Therefore creation and annihilation operators in physics are irrelevant.

Introduction

Through the work of Max Planck, Albert Einstein, Louis de Broglie, Arthur Compton, Niels Bohr, and many others, current scientific theory holds that all particles also have a wave nature (and vice versa).[1] This phenomenon has been verified not only for elementary particles, but also for compound particles like atoms and even molecules. For macroscopic particles, because of their extremely short wavelengths, wave properties usually cannot be detected.[2] Wave–particle duality is an ongoing conundrum in modern physics. Most physicists accept wave-particle duality as the best explanation for a broad range of observed phenomena; however, it is not without controversy.

Theory

Wave - particle duality elegantly incorporates kinetic energy in direction of movement (as particle or wave in the direction of movement) and kinetic energy against directions of movement (as wave against the spread of directions of movement) in relations the kinetic energy by [3] p. 51-52 :

Calculation of the kinetic energy of a particle moving at the velocity of v :

$$T_{kin} = \frac{mc^2}{\cos^2 \vartheta}\left[\ln\left|1 - \frac{v}{c}\cos\vartheta\right| + \frac{\frac{v}{c}\cos\vartheta}{1 - \frac{v}{c}\cos\vartheta}\right]$$

while ϑ isn't $\frac{\pi}{2}, \frac{3\pi}{2}$

For $\vartheta = 0°$ we have the kinetic energy in the direction of motion

$$T_{\mathrm{kin}_{ad}} = mc^2 \left[\ln\left|1 - \frac{v}{c}\right| + \frac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$$

For $\vartheta = 180^\circ$ we have the kinetic energy against the direction of motion

$$T_{\mathrm{kin}_{ad}} = mc^2 \left[\ln\left|1 + \frac{v}{c}\right| - \frac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$$

Kinetic energy of electron
$T_{kin\ id} = mc^2 [\ln |1-v/c| + (v/c) / (1-v/c)]$ in direction of motion of electron,
where v is velocity of electron.

Kinetic energy of electron
$T_{kin\ ad} = mc^2 [\ln |1+v/c| - (v/c) / (1+v/c)]$ against direction of motion of electron,
where v is velocity of electron.

Albert Einstein , who, in his search for a Unified Field Theory , did not accept wave-particle duality, wrote: [4]

> This double nature of radiation (and of material corpuscles)...has been interpreted by quantum-mechanics in an ingenious and amazingly successful fashion. This interpretation...appears to me as only a temporary way out...

The pilot wave model, originally developed by Louis de Broglie and further developed by David Bohm into the hidden variable theory proposes that there is no duality, but rather a system exhibits both particle properties and wave properties simultaneously, and particles are guided, in a

deterministic fashion, by the pilot wave (or its " quantum potential ") which will direct them to areas of constructive interference in preference to areas of destructive interference . This idea is held by a significant minority within the physics community. [5]

When in this idea we will replace the "quantum potential" by "electromagnetic potential" (or by " interference of electromagnetic waves"), the idea will be acepted large majority of physicists.

In 1900 Max Planck hypothesized that the frequency of light emitted by the black body depended on the frequency of the oscillator that emitted it, and the energy of these oscillators increased linearly with frequency (according to his constant h, where E = hν).

Theoretical Planck´s oscillator we can replace with circulating electron along ellipse around the nucleus of an atom between two Bohr´s energy levels, while electron moving alternately with acceleration and deceleration. This electron really blinks. When an electron moves at the speed of a higher Bohr energy levels (from afnucleus) to lower (towards perinucleus) radiates spectral lines of certain thickness. (real blinks) For example, spectral line Halfa 656.281 + - 1.4 nm. From the thickness of the spectral lines we can easily identify the smallest (in afnucleus) and largest (in perinucleus) the speed of the electron around the nucleus of an atom, taking into account the kinetic energy of the electron in the direction of movement and against the movement if we know that according to the Doppler principle is the lowest wavelength (highest frequency) and against the direction of motion of the electron is a wavelength of the highest (lowest frequency).

$\frac{v}{c}$	**Front of electron** $\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$	**Behind of electron** $\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$
Electron **0,002717146** **It is in the direction of motion (id)**	**3,70485**5771252357587813986763267e-6 **1,893177327504567944845613099435 6 eV** **Lambda$_{id}$ (v/c=0,002717146) = hc/E$_{k,id}$ = =654,900051928391151030938994 nm** **4,57768**2611525892171950925997589 5**e+14 Hz**	

	1,89317732750456794484561309943 56 **eV**	
Electron **It should be in the direction of motion (id)** The core of the spectral line **Hα**	**3,704856065018122815706535948504e-6** **Lambda$_{id}$ = c/ f$_{max}$= 654,9 nm** **4,577682974499923652466025347 3813e+14 Hz** **1,893177477618559059398381432 2796 eV**	
Electron **It should be against the direction of motion (ad)** The core of the spectral line **Hα**		**3,689083528934724999249217565 2666e-6** **1,885117728588101456591150980 6897 eV** **Lambda$_{ad}$ = c/ f$_{min}$= 657,7 nm** **4,558194587197810551923369317 3179e+14 Hz** **1,885117728588101456591150980 6903 eV**
Electron **0,0027212042** **It is against the direction of motion (ad)**		**3,689083**5634754294760932629961125e-6 **1,885117**7462383644166232590190353 **eV** **Lambda$_{ad}$ (v/c= 0,0027212042)=hc/ E$_{k,ad}$ =** **= 657,699993841987869470 nm**
Electron average speed **0,0027191751** For the **wings**[4] of spectral line **Hα** **(id)** and **(ad)**	**3,7**1040129711246297808215106825 21e-6 **1,89**6011085274278077239666691810 9 **eV** **Lambda$_{id}$ (v/c= 0,0027191751)=hc/ E$_{k,id}$ =** **=653,92124535655764172783570 nm**	**3,68**3593932950416663919083157891 2e-6 **1,88**2312550924966792415987772425 2 **eV** **Lambda$_{ad}$ (v/c= 0,0027191751)=hc/ E$_{k,ad}$ =** **=658,68 nm**

Conclusion:

$Lambda_{ad}$ (v/c= 0,0027212042)=hc/ $E_{k,ad}$ = 657,699993841987869470 nm = $Lambda_{ad}$ = c/ f_{min}= 657,7 nm against the direction of motion of electron, moving with speed v = 0,0027212042c. Electron is in perinucleum. Frequency 4,577682611525892171950925997589 5**e+14 Hz**

$Lambda_{id}$ (v/c=0,002717146) = hc/$E_{k,id}$ =654,900051928391151030938994 nm = $Lambda_{id}$ = c/ f_{max}= 654,9 nm in the direction of motion of electron moving with speed v = 0,002717146c. Electron is in afnucleum. Frequency 4,558194587197810551923369317 3179e+14 Hz.

The **wings**[6] of spectral line **Hα** are **1 nm**. (**658,68 nm – 657,7 nm =0,98 nm, 654,9 nm - 653,92 nm = 0,98 nm).**

Comparison

Official physics: **H_{alpha} : $E_3 – E_2$ = -1,51eV – (-3,40eV) = 1,89eV**

LV:

1,893177477618559059393 83814322796 eV, 654,90nm The core of the spectral line **Hα**

1,89317327504567944845613099 4356 **eV**

1,885117728588101456591150980 6897 eV **$Lambda_{ad}$ = c/ f_{min}= 657,7 nm** The core of the spectral line **Hα**
1,88231255092496679241598777242 52 **eV** **$Lambda_{ad}$ (v/c= 0,0027191751)=hc/ $E_{k,ad}$ =658,68 nm** For the **wings**[6] of spectral line **Hα**
1,89601108527427807723966669 18109 **eV** **$Lambda_{id}$ (v/c= 0,0027191751)=hc/ $E_{k,id}$ =653,92124535655764172783570 nm** For the **wings**[6]

Physics in the past formulated at least part of the truth about the physical phenomena.
Some ideas, even if they were doubtful and rejectable, are still valid today:

1. Electron radiates electromagnetic waves if and only if moves with acceleration from the higher Bohr´s energy levels to a lower. In atom, as a source of electromagnetic waves , them it then , when it moves from afnucleum to perinucleum along the ellipse . If the electron moves with decelerated motion, when it absorbs energy , while moving from a lower to a higher energy level, in the direction from perinukleum to afnucleum along the ellipse with of very small eccentricity . Eccentricity of the ellipse is maximal, when electron radiates head of series. Minimal, almost zero, eccentricity corresponds to edge series.
Faulty arguments leveled against classical physics - the electron is moving with acceleration along of a spiral towards the nucleus - we will find in Beiser[19] 5.7 The failure of classical physics , p.120 , Fig.5.12 : " Electron in an atom should be according to classical physics, rapidly converge to the nucleus , because as a result of its acceleration radiates energy."
Because the electron flashes **4,56793859936185,1361937147657453 e+14** times per second, i.e. emits energy **4,567938599361851361937147657453 e+14** times per second and absorbs energy **4,567938599361851361937147657453 e+14** times per second (for spectral line **Hα**). Electron creates in the transmission medium, electromagnetic wave **4,567938599361851361937147657453 e+14** times per second and absorbs energy **4,567938599361851361937147657453 e+14** times per second (for spectral line **Hα**) - Beiser´s argument is unfounded.
Electron is no oscillator. Atóm resembles to the solar system with the same "planets" (electrons) and different distances from the nucleus. Electron in an atom not to skip, but moves continuously with great speed, which increases from the value **0,002717146 c** (in afnucleum) to **0,0027212042 c** (in perinucleum). Then decreases from the value **0,0027212042 c** (in perinucleum) to **0,002717146 c** (in afnucleum) etc.
Changing the speed of the electron is repeated **9,135877198723702723874295314906e+14** times per sec. (spectral lines **Hα**).

2. The quantum harmonic oscillator as the quantum-mechanical analog of the classical Planck´s harmonic oscillator we can replace with circulating electron along ellipse around the nucleus of an atom between two Bohr´s energy levels, while electron moving alternately with acceleration and deceleration. Linear harmonic oscillator is only the projection of the real motion of the electrons along the ellipse in the plane perpendicular to the plane of the ellipse.
Linear harmonic oscillator is only the projection of the real motion of the electrons along the ellipse in the plane perpendicular to the plane of the ellipse.
Or more accurately, is only the projection - of rotating ellipses (Sommerlfeld's ellipses around perinucleus) - in a plane perpendicular to the plane of the ellipses.
In quantum mechanics are used so imprecise and imperfect expressions of motion of electrons around the nucleus.

Definition of heat

The main characteristic of **heat** is the energy transfer through a transmission medium.

And no transfer of the substance (= of real particles) from the source to the transmission medium.

Heat exists if and only if there is not a source.

In physics, **heat** refers to a proces of transfer of energy between a source and its **transmission medium** other than by work or transfer real particles.
Heat must therefore consist of living force

$$F = QE_{mov} = QE_{still}\left(1-\frac{v}{c}\cos\vartheta\right)^2 = QE_{still}\left(1+\frac{v}{c}\sin\phi\right)^2 =$$

$$= QE_{still} + QE_{still}\left(2+\frac{v}{c}\sin\phi\right)\frac{v}{c}\sin\phi$$

We can conceive, real moving particles - **e,** leptons (**μ−, τ−**), **W +, W-, Z** (= **β** electrons) or (**p +, n0, D, He-3, α**) - as moving charges and as the constituent of source in atoms. And creates (emites,radiates) and absorbs (anihilates) by your motion (if moves with acceleration and with deceleration) ,electromagnetic waves.

Heat as electromagnetic energy or (even outside physics too) thermal electromagnetic energy is the internal energy intake by the body (absorbed when charge (electron, proton) = real particle as a source, annihilates from the transmission medium , electromagnetic energy , i.e. source moving charge (electron, proton) absorbs (annihilates) from the transmission medium the electromagnetic energy, wherein transmission medium between the electrodes of hydrogen lamp is powered, in Interference comparator. Or transmit the electromagnetic energy to the transmission medium when charge (electron, proton) i.e. real particle as a source , creates in the transmission medium , electromagnetic wave . When the real particle as a source (charge-electron, proton) annihilates from the transmission medium , electromagnetic energy , source as a charge (electron, proton) aborbs (annihilates) from the transmission medium , electromagnetic energy by heat exchange to another body.

Definition of particle

The main characteristic of the particle :

Particle as a source exists if and only if repeatedly speeds up and slows down its movement in source along ellipse (when blinks).

Particle as a source, creates in the transmission medium, electromagnetic wave, that spreads in all directions with the velocity c / n,

regardless of the source movement, where n is the refractive index of the transmission medium.

In other words, particle, which is the source, can not become the transmission medium and remain in it.

Particle that is the source, remain in the source.

Definition of waves

The main characteristic of the waves is the energy transfer through a transmission medium.

And no transfer of the substance (= of real particles) from the source to the transmission medium.

Wave exists if and only if there is not a source.

In the case of electromagnetic waves, see **2.1.3 The electromagnetic field. Maswell's equations, p. 28**[3]

electric field intensity E and the magnetic induction B

are both associated with the intensity of a moving charge

$$\boldsymbol{E}_{\text{mov}} = \boldsymbol{E}_{\text{still}}\left(1-\frac{v}{c}\cos\vartheta\right)^2 = E_{still} + \text{B} \qquad \text{where} \qquad B = \frac{E_{\text{still}}}{\text{c}}\left(2+\frac{v}{c}\sin\phi\right)$$

The force acting on the moving electric charge is

$$\boldsymbol{F} = Q\boldsymbol{E}_{\text{mov}} = Q\boldsymbol{E}_{\text{still}}\left(1-\frac{v}{c}\cos\vartheta\right)^2 = Q\boldsymbol{E}_{\text{still}}\left(1+\frac{v}{c}\sin\phi\right)^2 =$$

$$= Q\boldsymbol{E}_{\text{still}} + Q\boldsymbol{E}_{\text{still}}\left(2+\frac{v}{c}\sin\phi\right)\frac{v}{c}\sin\phi$$

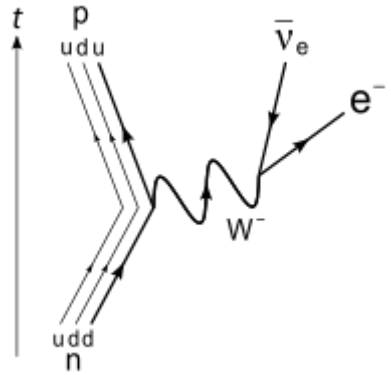
whereby $-\cos\beta = \sin\phi$

$$\boldsymbol{F} = \boldsymbol{F}_{\text{el}} + \boldsymbol{F}_{\text{m}} = Q\boldsymbol{E} + Q(\boldsymbol{v}\times\boldsymbol{B})$$

Neutron, β electron , gamma rays

Gamma rays have frequencies above 10 exahertz (10^{19} Hz), and therefore have energies above 100 keV and wavelength less than 10 picometers, often smaller than an atom. Gamma rays from radioactive decay commonly have energies of a few hundred keV, and almost always less than 10 MeV. The upper limit for such energies is about 20 MeV, and there is effectively no lower limit (they are sometimes classed as x-rays if their frequencies are lower than 10^{19} Hz).

β electron is emitted from the neutron

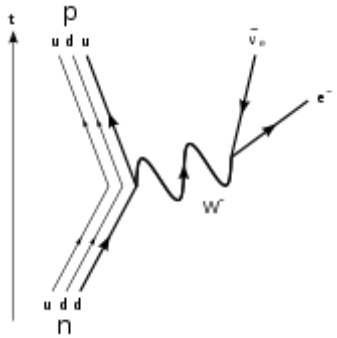


The Feynman diagram for beta decay of a neutron into a proton , electron , and electron antineutrino via an intermediate heavy W boson.
In the "stable" neutron, electron orbits around the center-of-mass with speed greater than 0,999994c.
If will start beta decay of a neutron, β electron has kinetical energy in direction of motion 80 398 MeV (it is W- boson), proton is moving at a speed 0,023337082847141190198366394399065c, and radiates γ ray.

Planck : 80 398 MeV = h*f , f is frequency circulation electron around center of mass in neutron in center- of- mass coordinate system

Neutron (= Proton and an electron orbiting a common center of mass) Beta decay is mediated by the weak force.

Electron		Proton	
$mc^2 \ln (1-v^2/c^2) +(2v^2/c^2)/ (1-v^2/c^2)$ in the direction of movement = kinetic energy of electron + energy of waves radiated by movement of electron	mc^2 [ln |1+v/c|- (v/c) / (1+v/c)] against the direction of movement = only energy of waves radiated by movement of electron	$mc^2 \ln (1-v^2/c^2) +(2v^2/c^2)/ (1-v^2/c^2)$ in the direction of movement = kinetic energy of proton + energy of waves radiated by movement of proton	mc^2 [ln |1+v/c|- (v/c) / (1+v/c)] against the direction of movement = only energy of waves radiated by movement of proton
v/c = 0,99999364465781184 **W+- BOSON = β electron W+-** **= 80 398±0.25 MeV = kinetic energy of elektron in direction of motion of**	0,193145591724398274765062819532 88 Muon neutrino < 170 keV = 0,17 MeV	5,444617456938884836504523246 4552e-4 0,510853218258925030861821842 245 MeV	1+v/c=1,0233368828175491399522 [ln |1+v/c|- (v/c) / (1+v/c)]= =2,64049092631168143129656 7e

electron **Planck : 80 398 MeV = h*f** h =6,6260689633e-34 Js= 4,1356673310e-15 eVs f = 80 398 MeV / h = 8,0 398e+10 eV /4,1356673310e-15 eVs =1944015162857885099075924 6,829759 Hz =1,9440151628578850990759246829 7e+25Hz angular velocity of the β electron= =2*pí*f=122146075082029946177950744,23446 rad/s Re orbit = 0,99999364465781184c /122146075082029946177950744,23446= =299790552,71634398041510272/ /122146075082029946177950744,23446= Re orbit =2,4543609159362090560796947 4e-18 m/rad 42,85035205755179156750106448016 5*0,023336882817549139952204241510852c = 0,99999364465781183999999999996341c 0,99999364465781184c	98,69718683716025935823051160662 2 keV = kinetic energy of elektron against direction of motion of electron < 170 keV = 0,17 MeV  Feynman´s diagram beta decay of neutron	v/c=0,023336882817549139952204 2 1- v/c=0,976663117182450860047795 7 [ln |1-v/c|+ (v/c) / (1-v/c)]= =2,8100617662290541726076 10e-4 kinetic energy of proton = =0,263660231070038428385127 MeV mp / me = =938,27201323 /0,51099891013= = 1836,152670054228007830683 $(mp / me)^{0,5}$ = 42,850352041193640674570966 60409 $(mp / me)^{0,5}$ = =42,850352057551791567501064 48= = 1,67262163783e-27 /9,1093825e-31 Rp orbit = Re orbit / / 42,850352057551791567501	-4 0,24774987373460089150090 4MeV against the direction of movement = only energy of waves radiated by movement of proton 5,990565824226854176364e+19 Hz 0,263660231070038428385127 4 MeV + +0,24774987373460089150090 MeV =0,511410104804639319886031 2 MeV β electron is radiated from a neutron .Logically follows that , gamma rays are actually caused by the movement of a proton

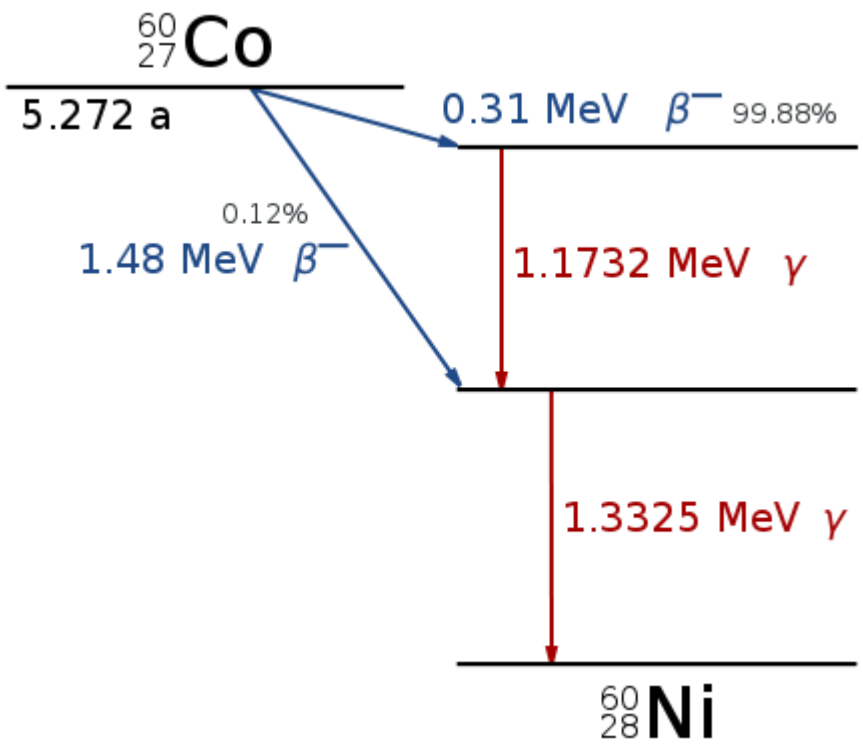
		Rp orbit= =5,72774971052696715576355e-20 m/rad angular velocity of the proton = =2*pí*f=1221460750820299461779507 44,23446 rad/s = angular velocity of the β electron in center-of-mass coordinates system Orbital speed of the proton =1221460750820299461779 5 rad/s* *5,727749710526967155e-20 m/rad = 6996221,461931022202057312 01m/s= =0,02333688281754913995220424 15cOrbital speed of the electron= =42,85035205755179156750106 44* *Orbital speed of the proton, see[3] p.63	
v/c = 0,999994396591 **BOSON Z 91 187,6 MeV/c^2 = 91, 187,6 GeV = kinetic energy of elektron in direction of motion of electron** **BOSON Z Planck 91 187,6 MeV = h*f** **h =6,6260689633e-34 Js=4,1356673310e-15 eVs** **f = 91 187,6 MeV / h = 9,11876e+10 eV/ /4,1356673310e-15 eVs =**	0,1931457797076835630826 **Muon neutrino=** 98,6972828964141347372324 keV = **kinetic energy of elektron** against **direction of motion of electron** < 170 keV = 0,17 MeV	5,450560896197703176422499786 48e-4 **0,5114108745308132011443904743729 7 MeV** **How energy of electron !!!!!!!!! I tis energy β electron in neutron too !??!!??** v/c =**0,0233369003654373615025801782 94** 1-v/c=0,97666309963456263849741982 [ln |1-v/c|+ (v/c) / (1-v/c)] = **0,0002810066059401183504689996 0813 kinetical energy of proton =**	1+v/c=**1,0233369003654373615025801782 94** [ln |1+v/c|- (v/c) / (1+v/c)]= =2,64049483679651967173250371e-4 **0,247750240644449079625375 MeV** **5,990574696068296495 81e+19 Hz** **against the direction of movement of**

=22049065532055484372807257,596126 Hz = =2,20490655320554843728072575961 26e+25 Hz **angular velocity of β elektron =2*pí*f=** 1385383645880508709183872 89,29769 rad/s **Re orbit = 0,999994396591**c / / 1385383645880508709183872 89,29769= =299790778,140242710678 / / 1385383645880508709183872 89,29769= = 2,16395493790966901278027 54e-18 m/rad **Radius of force reach of electron (v/c=0.99999 (electron in neutron W,Z):** **r_e =2,81829293843592903103229 93e-30 m** **…in the direction of movement** **r_e =5,83585755515363540846749 77e-14 m** **…against direction of movement**		**=0,26366063388636412151901497 MeV** **Rp orbit = Re orbit /** **/42,85035205755179156750106448016 = =5,050028375503863324 18e-20 m/rad** **angle speed of proton =2*pí*f= 1385383645880508709183872 89,29769 rad/s = angle speed of β electron in the center- of- mass coordinates system speed of proton = =1385383645880508709183872 89,29769 rad/s* *5,050028375503863324181e-20 m/rad = 6996226,722655564849893084993 1m/s =0,023336900365437361502580 178294878c** **Radius of force reach of proton (v/c= =0,0233369** proton in neutron …W,Z**):** **r_p=** 5,209499982315842954057e-15 m **in the direction of movement** **r_p=** 6,086602736065618022025e-15 m **against direction of movement**	**proton = only energy of waves radiated by movement of proton 0,26366063388636412151901 5 MeV+ +0,24775024064444907962537 5 MeV = = 0,51141087453081320114439 05 MeV** **β electron is radiated from a neutron . Logically follows that , gamma rays are actually caused by the movement of a proton**

Planck and orbital radius of proton and electron in a Co and Ni neutrons: **Cobalt-60 Decay**

0,31 MeV β electrons is radiated from a neutron 99,88% from CO-60, 1,48 MeV β electrons is radiated from a neutron 0,12% from

CO-60



Cobalt-60 Decay

Electron	**Proton**

$mc^2 \ln (1-v^2/c^2) + (2v^2/c^2)/ (1-v^2/c^2)$ **in the direction of movement = kinetic energy of electron+ + energy of waves radiated by movement of electron**	$mc^2 [\ln \lvert 1+v/c \rvert - (v/c) / (1+v/c)]$ **against the direction of movement = only energy of waves radiated by movement of electron**	$mc^2 \ln (1-v^2/c^2) + (2v^2/c^2)/ (1-v^2/c^2)$ **in the direction of movement = kinetic energy of proton + energy of waves radiated by movement of proton**	$mc^2 [\ln \lvert 1+v/c \rvert - (v/c) / (1+v/c)]$ **against the direction of movement = only energy of waves radiated by movement of proton**
f =2,836785229812769967207983828039 7e+20 Hz **Re orbit = 42,850352057551791567501064480165* *Rp orbit= 42,850352057551791567501064480165* *8,699071365794650862607319614204 4e-15 m =** **Re orbit = 3,727582705980686912548578386852 4e-13 m**		0,002685723494182526102379875547 03 **2,519939189865748959166990923 7MeV** v/c = **0,05172 ,** 1-v/c= 0,94828 [ln |1-v/c|+ (v/c) / (1-v/c)]= =0,001435391225536420709905255 71 **kinetic energy of proton = 1,346787414956734446171070076641 4 MeV** **Planck : 1,1732 MeV = h*f** **f=1,1732 MeV / h =1,1732e+6 eV/ /4,1356673310e-15 eVs = f = 283678522981276996720,79838280Hz** **f =2,836785229812769967207983828e+20 Hz** **Vlcek : v/c = 0,05172, v = 0,05172c** **v= 2*pí*f*r r = v/(2*pí*f)** **r =0,05172c/(2*pí*f) =8,699071365794650862607319 61e-15 m which is 10 times more than CODATA 2006 for the proton radius, the orbit is so real!** **Lower speed of proton, a larger radius orbit the proton in a neutron (in a center-of-mass system)** **0,05172c =15505265,92776 m/s** **2*pí*f =178240472755836628841 4,7841132354** **r = 0,05172c*h/ (2*pí* 1,1732 MeV)** **0,05172 / 1,1732 = 0,044084555063075349471530855779**	0,001250383666418079291813899348 2 **1,1732 MeV γ ray** **_____-** **1,346787414956734446171070076641 4 +1,1732 = =2,519987414956734446171070076641** **β electron is radiated from a neutron . Logically follows that , gamma rays are actually caused by the movement of a proton**

f= 3,22197095015812818045059533827 38e+20 Hz **Re orbit =** **42,85035205755179156750106448016 5*** ***8,18066498314118032563081834804e-15 m =** **=3,505443745924855686420510079437 8e-13 m** **Re orbit =3,505443745924855686420510079437 8e-13 m** f is electron frequency circulation in neutron around center of mass		0,00306569519516290057528919136 07 **2,87645600271503248058291476747 35** v/c = **0,055242,** 1-v/c= 0,944758 [ln |1-v/c|+ (v/c) / (1-v/c)] = 0,00164564772927706190965458676942 **kinetical energy of proton =1,54406520801616689043095 75 MeV** **Planck : 1,3325 MeV = h*f** **f= 1,3325 MeV / h =** **= 1,3325 e+6 eV/4,1356673310e-15 eVs** **f= 322197095015812818045,0595338 Hz** **f= 3,22197095015812818045059e+20 Hz** **2*pí*f=** **=2024424053419300272172,43422339Hz** **Vlcek : v/c = 0,055242** **v = 0,055242c =** **=16561134,964836 m/s** **v= 2*pí*f*r r = v/(2*pí*f)** **r = 0,055242c /(2*pí*f)** **=16561134,964836 /** **r =8,18066498314118e-15 m** **which is 10 times more than CODATA 2006 for the proton radius, the orbit is so real!** **0,055242/1,3325=** **=0,04145741088180112570356472795 5** Greater speed of proton, smaller radius of the orbit of the proton **(in a center-of-mass system)** **1,34678741495673444617107007664 14 +1,1732=** **=2,51998741495673444617107007 7MeV**	0,00142016385569561085607059400 1 **1,3325 MeV γ ray** **β electron is radiated from a neutron . Logically follows that , gamma rays are actually caused by the movement of a proton** **_____-** **1,54406520801616689043095750205 03 MeV +1,3325 MeV =** **=2,87656520801616689043095750205**
		0,06206184027937119578766962708235 **58,23088782368431751016927661 MeV** v/c = **0,2385** 1-v/c= **0,7615** [ln |1-v/c|+ (v/c) / (1-v/c)] =	0,02131578019805794905922092308681 =[ln |1+v/c|- (v/c) / (1+v/c)] [ln |1+v/c|- (v/c) / (1+v/c)]* *938,27201323MeV =

		0,040732529597334209642152853598 31 **kinetic energy of proton =** **=38,2181925492413301220936358 2 MeV** **38,2181925492413301220936358 2MeV +** **+20 MeV =** **= 58,2181925492413301220936358 MeV**	=19,99999999999999999999999999 MeV **Gamma rays The upper limit for such energies is about 20 MeV** **20e+6 eV/4,1356673310e-15 eVs =** **=4,8359789120572280382e+21H z** **γ rays**

h =6,6260689633e-34 Js= 4,1356673310e-15 eVs
W+- BOSON = β electron W+- = 80 398±0.25 MeV = kinetic energy of elektron in direction of motion of electron
Planck : 80 398 MeV = h*f
f = 80 398 MeV/h = 8,0 398e+10 eV /4,1356673310e-15 eVs =19440151628578850990759246,829759 Hz
=1,9440151628578850990759246829759e+25 Hz
angular velocity of β elektron =2*pí*f=122146075082029946177950744,23446 rad/s

Re orbit = 0,999994c /122146075082029946177950744,23446 m/rad=

= 299790659,245252 / 122146075082029946177950744,23446=

=2,45436178807973022974828113592 61e-18 m/rad

Rp orbit = Re orbit / 42,850352057551791567501064480165 = 5,72775174585101770802769630630 67e-20 m/rad

angular velocity of proton =2*pí*f=122146075082029946177950744,23446 rad/s = angular velocity of β elektron in center-of-mass coordinates system

velocity of proton =122146075082029946177950744,23446 rad/s*5,72779880532025724562025936038 74e-20 m/rad
=6996281,429294095682613768961493 2m/s= =0,023337082847141190198366394399065c

β electron is radiated from a neutron . Logically follows that , gamma rays(eg 1,1732 MeV γ ray 1,3325 MeV γ ray) are actually caused by the movement of a proton.

γ rays (γ photons) emitted by the excited protons

One neutron from the nucleus Co first converted on excited proton in **nucleus Ni *, (and being radiated beta electron) while the excited proton from nucleus Ni * gets into state non excited Ni , which emits a gamma photon. I.e. γ ray (γ photons) are emitted by excited protons.**

Comparing the kinetic energies of the 1,1732 MeV γ ray and proton we calculate the speed of proton :

1,1732 MeV = $\frac{mc^2}{\cos^2\vartheta}\left[ln|1-\frac{v}{c}\cos\vartheta| + \frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right] = eU_{mov} = eU_{still}\left(1-\frac{v}{c}\cos\vartheta\right)^2$ =

=938,27201323 * [ln |1+v/c|- (v/c) / (1+v/c)] ,

[ln |1+v/c|- (v/c) / (1+v/c)] = 0,00125038366641807929181389934827 23

v/c= 0,05172 1+v/c= 1,05172 [ln |1+v/c|- (v/c) / (1+v/c)] =0,00125033226864610539247461983 7639

v/c = **0,05172** 1-v/c= 0,94828 [ln |1-v/c|+ (v/c) / (1-v/c)] =0,00143539122553642070990525570939 13

the kinetic energy of proton = 1,34678741495673444617107007664 14 MeV

$1 - v^2/c^2$ =0,9973250416 v^2/c^2 =0,0026749584

Comparing the kinetic energies of the 1,3325 MeV γ ray and proton we calculate the speed of proton :

1,3325 MeV = $\frac{mc^2}{\cos^2\vartheta}\left[ln|1-\frac{v}{c}\cos\vartheta| + \frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right] = eU_{mov} = eU_{still}\left(1-\frac{v}{c}\cos\vartheta\right)^2$ =

= 938,27201323 * [ln |1+v/c|- (v/c) / (1+v/c)] , [ln |1+v/c|- (v/c) / (1+v/c)] = =0,00142016385569561085607059400065 87

v/c =0,055242 1+v/c= 1,055242 [ln |1+v/c|- (v/c) / (1+v/c)] =**0,00142**0474658858386656346045912884

$1 - v^2/c^2$ = 0,996948321436 v^2/c^2 = 0,003051678564

v/c =0,0233371 1+v/c= **1,0233371**

[ln |1+v/c|- (v/c) / (1+v/c)] = 2,64053932485043547475139356369 36e-4

$1 - v^2/c^2 = 0{,}99945537976359$ $v^2/c^2 = 0{,}00054462023641$

$\ln (1-v^2/c^2) =$ **-5,44768595879778748912292452646 89e-4**

v/c = **0,0233371** , 1-v/c= 0,9766629
[ln |1-v/c|+ (v/c) / (1-v/c)]= 2,810114901159703732253368920 9691e-4

Proton 938,27201323 MeV/c^2 :

v/c	**mc^2 ln $(1-v^2/c^2)$ +$(2v^2/c^2)$/ $(1-v^2/c^2)$** **in the direction of movement = *kinetic energy* of proton + + energy of waves radiated by movement of proton**	**mc^2 [ln |1+v/c|- (v/c) / (1+v/c)]** **against the direction of movement = only energy of waves radiated by movement of proton**
0,0233371	5,450654226010139207004762484662 7e-4 **0,51141963140591407441489142146824 MeV** **becose : for emission of electron β from neutron is valid equation:** ***kinetic energy* of proton + energy of waves radiated by movement of proton = kinetic energy of elektron in direction of motion of electron =** **=0,26366521657187376826117133419276 MeV+** **+ 0,24775441483404030615372008727548 MeV γ ray (for emission of electron β from neutron) =** **=0,51141963140591407441489142146776 MeV =free electron** **(for electron speed v =0,68215556710062731616715 53c) =** **=0,51099890997249598396127388955714** MeV **for a free electron, which left neutron,** **from β electron (W + -, or Z) becomes a free electron (v = 0,6821555671 c)** ———————————————————————- v/c = **0,0233371** , 1-v/c= 0,9766629 [ln |1-v/c|+ (v/c) / (1-v/c)] =	2,640539324850435474751393563693 6e-4 **0,24775441483404030615372008727548 MeV γ rays for emission of electron β from neutron** **energy of waves radiated by movement of proton:** ———————————————————————- **mc^2 [ln |1+v/c|- (v/c) / (1+v/c)] =938,27201323 MeV *** *****2,640539324850435474751393563693 6e-4 = = **0,24775441483404030615372008727548 MeV γ rays** **(for emission of electron β from neutron)** ———————————————————————- **Comment:** **0,26366521657187376826117133419276+** **+0,24775441483404030615372008727548=** **=0,51141963140591407441489142146776** **for emission of electron β from neutron is valid equation:** ***kinetic energy* of proton + energy of waves radiated by movement of proton = kinetic energy of elektron in direction of motion of electron (for v/c =0,68215556710062731616715 53) =** **=0,51099890997249598396127388955714** MeV **=free electron (for electron speed**

	= 2,810114901159703732253368920969 1e-4 **kinetic energy of proton =** **=0,263665216571873768261171334192 76 MeV**	**v =0,6821555671006273161671553c) =** **=0,5109989099724959839612738895571 4** MeV **for a free electron, which left neutron,** **from β electron (W + -, or Z) becomes a free electron (v = 0,6821555671 c)**

W+- BOSON = β electron W+- = 80 398±0.25 MeV = kinetic energy of elektron in direction of motion of electron
Planck : 80 398 MeV = h*f
f = 80 398 MeV/h = 8,0 398e+10 eV /4,1356673310e-15 eVs =19440151628578850990759246,829759 Hz =1,9440151628578850990759246829759e+25 Hz
angular velocity of β elektron =2*pí*f=122146075082029946177950744,23446 rad/s

Re orbit = 0,999994c /122146075082029946177950744,23446 m/rad=

= 299790659,245252 / 122146075082029946177950744,23446=

=**2,45436178807973022974828113592 61e-18 m/rad**

Rp orbit = Re orbit / 42,850352057551791567501064480165 = 5,72775174585101770802769630630 67e-20 m/rad see you [3] p.68.

angular velocity of proton =2*pí*f=122146075082029946177950744,23446 rad/s = angular velocity of β elektron in center-of-mass coordinates system

velocityofproton=122146075082029946177950744,23446rad/s*5,72779880532025724562025936038 74e-20m/rad

=6996281,429294095682613768961493 2m/s= =0,023337082847141190198366394399065c =0,0233371c

for emission of electron β from neutron is valid equation:
***kinetic energy* of proton + energy of waves radiated by movement of proton = kinetic energy of elektron in direction of motion of electron (for electron speed v =0,6821555671006273161671553c) =0,5109989099724959839612738895571 4** MeV

0,05172	0,0026857234941825261023798755470303 **2,5199391898657489591669909237489**	0,0012503836664180792918138993482723 **1,1732 MeV γ rays**

	v/c = 0,05172 , 1-v/c= 0,94828 [ln |1-v/c|+ (v/c) / (1-v/c)] = =0,0014353912255364207099052557093913 **kinetic energy of proton =** **1,346787414956734446171070076641 6 MeV** **1,346787414956734446171070076641 4 +1,1732 =** **= 2,519987414956734446171070076641 MeV=** **= mc^2 ln (1-v^2/c^2) +(2v^2/c^2)/ (1-v^2/c^2) =** **=in the direction of movement = *kinetic energy* of proton + + energy of waves radiated by movement of proton**	**Comparing the kinetic energies of the 1,1732 MeV γ rays and proton we calculate the speed of proton :** **1,1732 MeV = =** $\frac{mc^2}{\cos^2\vartheta}\left[ln\left|1-\frac{v}{c}\cos\vartheta\right|+\frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]=eU_{\mathrm{mov}}=$ **=938,27201323 MeV * [ln |1+v/c|- (v/c) / (1+v/c)] ,** **v = 0,05172c see you above** **mc^2 [ln |1+v/c|- (v/c) / (1+v/c)] = 1,1732 MeV** **against the direction of movement = only energy of waves radiated by movement of proton = energy of γ rays 1,1732 MeV**
0,055242	0,00306569519516290057528919136071 14 **2,876456002715032480582914767473 5** v/c = 0,055242, 1-v/c= 0,944758 [ln |1-v/c|+ (v/c) / (1-v/c)] = = 0,0016456477292770619096545867694231 **kinetic energy of proton =** **=1,5440652080161668904309575020503 MeV** **1,5440652080161668904309575020 50 MeV+1,3325 MeV=** **=2,8765652080161668904309575020 5 MeV=** **= mc^2 ln (1-v^2/c^2) +(2v^2/c^2)/ (1-v^2/c^2) =** **=in the direction of movement = *kinetic energy* of proton + + energy of waves radiated by movement of proton**	0,0014201638556956108560705940006587 **1,3325 MeV γ rays** **Comparing the kinetic energies of the 1,3325 MeV γ ray and proton we calculate the speed of proton :** **1,3325MeV=** $\frac{mc^2}{\cos^2\vartheta}\left[ln\left|1-\frac{v}{c}\cos\vartheta\right|+\frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]=eU_{\mathrm{mov}}=$ = **938,27201323 * [ln |1+v/c|- (v/c) / (1+v/c)] ,** **[ln |1+v/c|- (v/c) / (1+v/c)]=** **=0,0014201638556956108560705940006587** **v =0,055242c** **mc^2 [ln |1+v/c|- (v/c) / (1+v/c)] = 1,3325 MeV** **against the direction of movement=onlyenergy of waves radiated bymovement of proton = energy of γ rays 1,3325 MeV**

0,1	0,010151684348518760836653162644 02 **9,525041311360178698631442089232 5**	0,004401088895233950953043032371 6742 **4,129418538135355712558763177 5622**
0,2	0,042511338813078203778756268178333 **39,887199453249524912925837248854**	0,015654890127287959545051358487848 **14,688545276624924762274133011344**
0,2385 upper limit for speed of proton in neutron= 0,2385c	0,062061840279371195787669627082353 **58,230887823684317510169276612683 MeV** v/c = 0,2385 1-v/c= 0,7615 [ln |1-v/c|+ (v/c) / (1-v/c)] = 0,040732529597334209642152853598307 **kinetic energy of proton = =38,218192549241330122093635817073 MeV** **Comment: mc^2 ln (1-v^2/c^2) +(2v^2/c^2)/ (1-v^2/c^2) = = in the direction of movement = *kinetic energy* of proton + + energy of waves radiated by movement of proton = 38,218192549241330122093635817073 MeV + 20 MeV = = 58,218192549241330122093635817073 MeV**	0,021315780198057949059220923086 81 **Gamma rays The upper limit for such energies is about 20 MeV** **20 MeV** = $\frac{mc^2}{\cos^2\vartheta}\left[ln\left|1-\frac{v}{c}\cos\vartheta\right|+\frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]=eU_{\text{mov}}=$ = = **938,27201323 [ln |1+v/c|- (v/c) / (1+v/c)] , [ln |1+v/c|- (v/c) / (1+v/c)]=** =0,021315780198057949059220923086 81 v/c= **0,2385** 1+v/c= 1,2385 [ln |1+v/c|- (v/c) / (1+v/c)] =0,021329310682036986145516773484046 v/c = **0,2385** 1-v/c= **0,7615** [ln |1-v/c|+ (v/c) / (1-v/c)] = 0,040732529597334209642152853598307 **kinetic energy of proton = 38,218192549241330122093635817073 MeV** 1 - v^2/c^2= 0,94311775 , v^2/c^2 =0,05688225 ln (1-v^2/c^2) = **-0,058564136699643354622393167303608**

0,3	0,10349151833095647532065947344 22 **97,10319525661598153061997395769 7**	0,03159503369826028280472675611172 4 **29,64473587613636789574012441631 5**
0,4	0,20659899380760319968003169486638 **193,84605385115215744477303017213**	0,05075795090692721621887912450270 6 **47,62476478487210351476722448051 1**
0,5	0,37898459421488573922744766067367 **355,59063819715545377935410145411**	0,07213177477483104864467978213101 6 **67,67922553583365794495576210873 1**
0,6	0,67871289737158048846740981938 1 **636,81731662199920030130340847408**	0,09500362924573555365093703114834 2 **89,13924647655280431625336489119 3**
0,7	1,24822407418721479576565969052 5 **1171,17371504979090234948879712 8**	0,11886354517981745505507257495347 **111,52633783552238591841798542491**
0,8	2,53390430802357418914452736294 86 **377,49149642144899674890050027**	0,14334222045767456374528669617442 **134,49399376968080492945211734271 / meson pí +- /**
0,9	6,86558458265203330249936031199 37 **6441,78586836577261928908039072 08**	0,16816967564607898651735176667717 **157,78890013268263163523366844813**
0,99	94,58547701556238001109694944298 1 **88746,90594171160633366224449457 6**	0,19064720155047137913293235234906 **178,87893361542635835455105003 19**
0,999	992,28514190159865722507680221572 **931033,37779022920267003749645 63**	0,19289718058079427713077657976902 **180,99002596993270707595628949319**
0,9999	9989,98278180858378340824119339 13 **9373321,25682057572695358073549 64**	0,19312218055996614431315921000012 **181,20113715336700296534860754822**
0,999994	166653,83606125849039287728844767 **156366630,27369937738835558708407**	0,19314568055994531391725237153108 **181,22318654565836338784472026638**

20 MeV = $\frac{mc^2}{\cos^2\vartheta}\left[ln|1-\frac{v}{c}\cos\vartheta| + \frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right] = eU_{\text{mov}} = eU_{\text{still}}\left(1-\frac{v}{c}\cos\vartheta\right)^2$ =

= 938,27201323 * [ln |1+v/c|- (v/c) / (1+v/c)] ,

[ln |1+v/c|- (v/c) / (1+v/c)] =0,021315780198057949059220923086 81

v/c= **0,2385** 1+v/c= 1,2385 [ln |1+v/c|- (v/c) / (1+v/c)] =0,021329310682036986145516773484046
v/c = **0,2385** 1-v/c= **0,7615** [ln |1-v/c|+ (v/c) / (1-v/c)] = 0,040732529597334209642152853598307
kinetic energy of proton = 38,218192549241330122093635817073 MeV

1 - v^2/c^2= 0,94311775 , v^2/c^2 =0,05688225 ln (1-v^2/c^2) = **-0,05856413669964335462239316730360 8**

Electron 0,51099891013 MeV/c^2

v/c	**mc^2 ln (1-v^2/c^2) +(2v^2/c^2)/ (1-v^2/c^2) in the direction of movement = kinetic energy of of realy electron + energy of waves radiated by movement of electron**	**mc^2 [ln |1+v/c|- (v/c) / (1+v/c)] against the direction of movement = only energy of waves radiated by movement of electron**
0,1	0,010151684348518760836653162644 02 **0,005187499638076865867387893067901 6 MeV**	0,004401088895233950953043032371 6742
0,2	0,042511338813078203778756268178333	0,015654890127287959545051358487848
0,3	0,103491518330956475320659473442 2	0,031595033698260282804726756111724
0,4	0,206598993807603199680031694866 38	0,050757950906927216218879124502706
0,5	0,378984594214885739227447660673 67 **0,193660714599866915767705142785 52 MeV**	0,072131774774831048644679782131016
	0,31 MeV ...99,88% **0,31 MeV β electrons is radiated from a neutron 99,88% from CO-60, see you scheme-fig. Cobalt-60 Decay above.**	
0,6	0,678712897371580488467409819381 **0,346821550848052171242419451727 75 MeV**	0,095003629245735553650937031148342
0,7	1,248224074187214795765659690525	0,118863545179817455055072574953 47
0,8	2,533904308023574189144527362948 6 **1,294822339773758225000051959520 4 MeV**	0,143342220457674563745286696174 42 **0,073247718429485891868064712669302**

	1,48 MeV ....0,12 % **1,48 MeV β electrons is radiated from a neutron 0,12% from CO-60 see you scheme-fig. Cobalt-60 Decay above.**	
0,9	6,865584582652033302499360311993 7 **3,508306239140519922605637724450 6**	0,16816967564607898651735176667717 **0,08593452097206196571826171710577 7**
0,99	94,585477015562380011096949442981	0,19064720155047137913293235234906
0,999	992,285141901598657225076802215 72	0,19289718058079427713077657976902
0,9999	9989,982781808583783408241193391 3 **5104,870313721651903600403226683 MeV**	0,19312218055996614431315921000012
0,999994 W+-	166653,836061258490392877288447 67 **85159,928596286780506969369911588 MeV**	

Discussion to Cobalt-60 Decay

Neutron is source **β rays - β electrons (bosons Zo W+- too) , γ rays, electron neutrinos, muon neutrinos, tauon neutrinos:**

1a.) β electron is radiated from a neutron ,for v/c = 0,999994396591 BOSON Z = β electron
for v/c = 0,99999364465781184 W+- BOSON = β electron W+-

1b.) electron neutrinos, muon neutrinos, tauon neutrinos are waves against the direction of movement (= only energy of waves radiated by movement of electron) and in direction of movement (= only energy of waves radiated by movement of electron)

2. Logically follows that , gamma rays are actually caused by the movement of a proton in neutron.

Quarks

Why are discovered by quarks in pairs?
u,d
c,s
t,b
We show that each particle is accompanied by his twin.
A pair of quarks of one generation = one speed of proton.
u,d quarks are in the proton at speed **of proton :**

from v= 0,05875c to v= 0,105065c .... down – up,

PROTON	**Front of proton**	**Behind proton**
$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of proton in direction of motion of proton**	$\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of proton** against **direction of motion of proton**
0,05875	**0,0018704988039450329861777626124876** ***Down quark: 1,7550*** **MeV**	**0,0015986835148543461794415692315107** ***Up quark:*** **1,5 MeV**
0,075	**0,0031195396113692225967210545118109** ***Down quark:*** **2,92697671 MeV**	**0,0025532197191610043413170483032692** ***Up quark:*** **2,4MeV**
0,081622	**0,0037302615346601410853636615401917** *Down quark:* **3,5 MeV**	**0,0029991740444424494322328316937018** *Up quark:* **2,81404106871 MeV**
0,08878	**0,0044589013511482922312132108807756** *Down quark:* **4,18366235 MeV**	**0,0035171037326795615947714523093236** *Up quark:* **3,3 MeV**
0,094686	**0,0051156918494022662432562213837619** *Down quark:* **4,8MeV**	**0,0039715278483606256196473452168454** *Up quark:* **3,72637 MeV**
0,105065	**0,0063947340594173847177662769260429** *Down quark:* **6 MeV**	**0,0048283015026596502291040657295924** *Up quark:* **4,530260 MeV**

c,s quarks are in the proton at speed **of proton**

from v=0,5111c to v=0,7805c :

PROTON	**Front of proton**	**Behind proton**

$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of proton in direction of motion of proton**	$\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of proton** against **direction of motion of proton**
0,5111	0,32981074951021491557976368704646 c quark: 309,45219592784458529 1MeV 1.16–1.34 **GeV**	0,07460743427266448931608265829 9818 s quark: 70,00206755693781114693070162 0**MeV**
0,6668	0,90218811150262740395503144610525 c quark: 846,49785569 **MeV** 1.16–1.34 GeV	0,11085762440585416420687015655648 s quark: 104,0146 **MeV**
0,68215556710062731616715 53	1,00000000000000000000000025402 94 proton 938,27201323 **MeV**	0,11455138503597051915497991380189 107,48035865598495497447128210228 **MeV** muon ??
0,68235958021424280152472	1,00137865656415237122738835717 32 neutron = 939,5655681 **MeV**	0,11460056876623030010684504976 95 107,52650637359396091907658895042 **MeV** muon ??
0,713	1,23604749426877325552441352943 1 c quark: 1160 **MeV** 1.16–1.34 **GeV**	0,12201738104659464824870350196726 s quark=114,485493763640 **MeV**
0,72585	1,35355827716301434378382094041 84 c quark: 1270 **MeV** 1.16–1.34 **GeV**	0,12514431408438967945446850497659 s quark: 117,41941 **MeV**
0,73333	1,42815727326988258696780184681 63 c quark: 1340 MeV 1.16–1.34 **GeV**	0,12696860023316592749751861919307 s quark= 119,1311**MeV**

0,7805	2,039405609569535457770297215985 5 c quark:1913,517207083363387638 MeV/c^2 1.16–1.34 **GeV**	0,13853421250289559168530489708379 s quark: 129,982774 **MeV**
0,9928305	**Higgs Boson /p:** 133,54335827671029218747501724036 **Higgs Boson 125300 MeV/c^2**	**0,19135481327900503397500506877 4** **179,54287216724002207202 75**MeV/c^2

t quark is in the proton (neutron) at speed **of proton (neutron):**
v=0,994637c for *Top quark:* 169 100MeV
v=0,994766c for *Top quark:* 173 400MeV/c^2

PROTON	Front of proton	Behind proton
$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of proton in direction of motion of proton**	$\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of proton** against **direction of motion of proton**
0,9928305	**Higgs Boson /p:** 133,54335827671029218747501724036 **Higgs Boson 125300 MeV/c^2**	**0,19135481327900503397500506877 4** **179,54287216724002207202 75**MeV/c^2
0,994637	180,224921574579959295712904 69898 ***Top quark:* 169 100MeV**	0,19180643378644112290601029593 852 **179,96660877927080426588414 8 MeV**
0,994766	184,807814317162418343445403 16264 ***Top quark:* 173 400MeV**	0,19183868355887822897300444041 866 **179,99686783818157713891779163 MeV**

b quark is in the proton (neutron) at speed **of proton (neutron):**

v=0,8665c pre 4,2 GeV *Bottom quark*

PROTON	Front of proton	Behind proton
$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of proton in direction of motion of proton**	$\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of proton** against **direction of motion of proton**
0,8665	4,476313841592169302436394 4,2 GeV ***Bottom quark***	0,15982714099050308721766957 5 **149,96133334595438795425311140944 MeV**

Leptons (electron, muon, tau), W + - Z bosons and neutrinos

Leptons (electron, muon, tau), W + - Z bosons and neutrinos (electron neutrino , muon neutrino, tau neutrino) can be replaced with electron moving at different speeds from 0.1c up to 0.999.. c :

ELECTRON	Front of elektron	Behind elektron
$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of elektron in direction of motion of electron**	$\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of elektron** against **direction of motion of electron**

0,0799086445 Kirchner for U_mov=1638,0 V	0,00356628385160740599059464828127 11	0,00288070430067105631362487868874
0,082238621 Kirchner for U_mov =1735,96V	0,00378998886663387919657356552705 31	0,00304233231777031919690807846773952
0,202205081 Perry,Chaffee for U_mov =10761,70903 V	0,02755125385653292262096002021821	0,01596227383294966542849887386034 9
0,269608445 Perry,Chaffee for U_mov =19623,64596 V	0,05495413305133968524372351145005 2	0,02635295616802296185241633216709
0,68215556710062731616715 53 **Electron**	1,00000000000000000000000025402 94 **0,51099890997249598396127388956** MeV	0,11455138503597051915497991380189 **58,53563288922062294904123370199 keV**
0.9	6,69741490700595431598200854531 56	0,16816967564607898651735176677
0.99	94,39482981401190863196401709063 1	
0,9953098334237836613341	206,84975630513419099721054873516	
0,995308032046	206,76828223744685656745189701043 **Muon 105,658366838 MeV =** **= kinetic energy of elektron in direction of motion of electron**	0,19197419073094806197627099443559 **Muon neutrino** **98,09860220636650171560146311 6988 keV** **= kinetic energy of elektron** against **direction of motion of electron < 170 keV**
0.999	992,09224472101786294794602563595	
0,99971316674	3477,18894397593998486635332040 24 **Tauon 1776,84±0.17 MeV = kinetic energy of elektron in direction of motion of electron**	0,19307547223543705549505792712 01 **Muon neutrino** 98,09883233061547455160478291729 2 **keV = kinetic energy of elektron** against **direction of motion of electron < 170 keV**
0,9999	9989,78965962802381726392803418 13	0,19309967932240370368831545374951
0,99999	99987,48707453502977157991004272 7	0,19314468055994533025072170572902
0,999992	124987,26393098371556182414374764	0,19314518055994532008396278843204
0,99999364465781184	157334,97358013414086695519224486 **W+ BOSON =** 80 398±0.25 MeV	0,19314559172439827476506281953288 **Muon neutrino** **98,69718683716025935823051160662 2 keV < 170 keV**
0,99999432258918	176123,54940648581389887129681009	**0,19314576120724031322974724564287**
0,999994396590953	**178449,69572422000527027492336062** **BOSÓN Z = 91 187,6 MeV = 91, 187,6 GeV**	**0,19314577970768356308259999253441** **Muon neutrino** **98,69728289641413473723244731257 keV < 170 keV**

where v is velocity of electron , proton , neutron, alpha particle.

$\frac{v}{c}$	**Front of electron, proton, neutron, deuteron, He-3, α-particle** $\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$	**Behind of electron, proton, neutron, deuteron, He-3, α-particle** $\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$	**Decay modes**
Neutron 0,583600949752111668957 9	**K+/n0 : 0,5254312381545198230873 Kaon K+ 493.677 MeV/c2**	**/n0 : 0,0911735513608241401296948 2667 85,6635122670815933982547583 MeV/c2 f =2,0713346011694342531285 1e+22 Hz …gamma rays γ + γ**	**μ+ + νμ or π+ + π0 or π0 + e+ + νe**
Neutron 0,584840845620204971 75	**K0/n0 : 0,5296214734391580471559019 1755369 K0 497,614 MeV/c2**	**?/n0 : 0,0914621742508631054533545 10569334 85,9346923419211170942161 44 MeV/c2 f = 2,0778917064911439211823414e+22 Hz …gamma rays γ + γ**	**π± + e∓ + νe or π± + μ∓ + νμ or π0 + π0 + π0 or π+ + π0 + π−**
Neutron 0,599835288	**η/n0: : 0,5830919409181876989162329 3001713 Eta meson η 547,853 MeV/c2**	**γ ? /n0 : 0,0949650261957629256534751 96132505 89,22585075434455074110 MeV/c2 f=2,1574715663074004106597 6e+22Hz…gamma rays γ + γ**	**γ + γ or π0 + π0 + π0 or π+ + π0 + π−**
Neutron 0,684995029420488 64	**η′(958)/n0: : 1,0193862207063241677384071561382 Eta prime meson η′(958) 957,78 MeV/c2**	**γ ? /n0 : 0,1152361746771315747676385 56 108,27192004399275268448921 MeV/c2 f = 2,6180034928167789612963 78e+22Hz …gamma rays γ + γ**	**π+ + π− + η or (ρ0 + γ) / (π+ + π− + γ) or π0 + π0 + η**
Alpha particle 0,740795108978806110189	**Λ0b5620,2/α: 1,5078154480367796791747546093745 bottom Lambda Λ0b 5620,2MeV/c2**	**/α: 0,1287921114454339013524184482 8114 480,0570425830862480784682 47 MeV/c2**	**See Λ0b decay modes**
Alpha particle 0,753304289775682	**Ω−b /α: 1,6539771248615256969702790233076 bottom Omega Ω−b 6165 MeV/c2**	**K+ /α: 0,1318538262428662912921621 6386684 491,4692147603471497773483831 7031 MeV/c2 2,20778523965285 MeV/c2 less than K+ mezón 493,677 MeV/c2**	**(Ω− +J/ψ seen)**
		K+ 493,677/α: 0,1324461419707858865469240 5272934	**μ+ + νμ or π+ + π0 or**

			π0 + e+ + νe
0,76	**1,739550311026520918277625358595**	**0,133495627231878595513070972610 93**	
		K0, K0S, K0L 497,614/α: 0,133502380079790324743022392323 03	π± + e∓ + νe or π± + μ∓ + νμ or π0 + π0 + π0 or π+ + π0 + π−
Neutron 0,8103668245118	Σ+c//n0 : 2,610675166291363936442125449781 3 2452,9 MeV/c2	(π0/n0: 0,1436585501770159947294269) (π+ /n0 : 0,1485475979299) 0,145903730876811430637395356988 86 137,086094083521386745675549958 53 MeV/c2 ..... pion pi π0	Λ+c + π0
	Σc (2455) /n0 : 2,612910242846347196927045559995 1		
Proton 0,8105263656822	Σ+c/ p+ : 2,614273770499822082725714459394 2 2452,9 MeV/c2	0,145943178944838051921943801563 136,934405138965387693872433893 14 MeV/c2 ..... pion zero π0	Λ+c + π0
Neutron 0,821091179644426	Ω0c //n0 : 2,868560360466584076602721885217 7 Charmed Omega Ω0c 2695,2 MeV/c2	π+ /n0 : 0,148557194855674546931345094315 45 139,579196970388522052219648444 53 MeV/c2 ..... pion pi +-, π +,π − π - = 139,57018 +- 0,00035 MeV/c2	See Ω0c decay modes
	Ωc0 = 2695,2 Ωc0 /p+ : 2,872514439165120347196190474590 8		
Proton 0,8212451756	Ω0c / p+ : 2,872514439165120347196190474590 8 2,872514499307888530047789439106 2,695.2±1.7 MeV/c2 6,9±1.2×10−14 s	Proton v/c= 0,82188 π+ / p+ : 0,148752358758858302381951172400 16 139,570175091172160957676021395 46…. MeV/c2 139,57 = π- +	See Ω0c decay modes
Electron 0,996425584251459554502	**π-/e- : 273,132047490235585731158491 92 139,5701835 MeV/c^2 pi minus π- 139,57 MeV/c^2**	**νμ/e- : 0,192253577576789948957123447070 72 98,241372067052395131711693801718 keV/c^2 = kinetic energy of elektron against direction of motion of electron <**	**μ+ + νμ**

		170 keV Muon neutrino νμ	

Conclusion

All movements in physics are based on principle of **action - reaction** and on velocity of stable particles (**e-, p+,n0, D, He-3, α**).

Action, as a motion of stable charged particles (**e-, p+,n0, D, He-3, α**), is characterized speeds up in source along ellipse.

Action creates unstable particles (leptons **μ−, τ−**, baryons, mesons), bosons **W +, W-, Z** (= particles = **β** electrons moving at nearly the speed of light)in direction of motion of stable particles (e-, p+,n0, D, He-3, alfa).

Reaction creates in the transmission medium, electromagnetic waves, as unstable "particles" - neutrínos **νe, νμ, ντ** , mesons π^0, π^+, π^- , **η , K** and **gamma rays (=**waves of extremely high frequency $>10^{19}$ Hz) - against direction of motion of stable particles (e-, p+,n0, D, He-3, alfa).

Accompanying activity of **reaction** on movement of stable particles in the transmission medium are waves, or unstable " particles" , i.e. neutrinos and mesons. See you please Shortened great table of elementary particles.[20]

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