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 $v_e = 0,003c$ 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

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

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

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

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 $E = h\nu$).

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).

$\dfrac{v}{c}$	Front of electron $\left[ln\left\|1 - \dfrac{v}{c}\right\| + \dfrac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$	Behind of electron $\left[ln\left\|1 + \dfrac{v}{c}\right\| - \dfrac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$
Electron **0,002717146** **It is in the direction of motion (id)**	3,704855771252357587813986763267e-6 1,8931773275045679448456130994356 eV **Lambda**$_{id}$ (v/c=0,002717146) = $hc/E_{k,id}$ = =654,900051928391151030938994 nm	

	4,5776826115258921719509259975895e+14 Hz **1,89317**7327504567944845613099435**6 eV**	
Electron **It should be in the direction of motion (id)** The core of the spectral line **Hα**	**3,70485606501812281570653594850**4e-6 $Lambda_{id} = c/ f_{max}= 654,9$ **nm** **4,57768**29744999236524660253473813e+14 Hz **1,89317**747761855905939838143227**96 eV**	
Electron **It should be against the direction of motion (ad)** The core of the spectral line **Hα**		**3,68908352893472499924921756526**66e-6 **1,88511**772858810145659115098068**97 eV** $Lambda_{ad} = c/ f_{min}= 657,7$ **nm** **4,55819**4587197810551923369317317**9e+14 Hz** **1,88511**772858810145659115098069**03 eV**
Electron **0,0027212042** **It is against the direction of motion (ad)**		**3,68908356**34754294760932629961125e-6 **1,88511**774623836441662325901903**53 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**	**3,71**04012971124629780821510682521e-6 **1,89**601108527427807723966669181**09 eV** $Lambda_{id}$ **(v/c= 0,0027191751)=hc/ $E_{k,id}$ =**	**3,68**35939329504166639190831578912e-6 **1,88**231255092496679241598777242**52 eV** $Lambda_{ad}$ **(v/c= 0,0027191751)=hc/ $E_{k,ad}$ =**

(id) and **(ad)**	**=653,9212453565576417278357O nm**	**=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 4,57768261152589217195O9259975895e+14 Hz

Lambda$_{id}$ (v/c=0,002717146) = hc/E$_{k,id}$ =654,90005192839115103O938994 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 9e+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:

1,8931774776185590593983814322796 eV,   654,90nm   The core of the spectral line **Hα**

1,893177327504567944845613O994356 **eV**

1,8851177285881014565911509806897 eV   Lambda$_{ad}$ = c/ f$_{min}$= 657,7 nm   The core of the spectral line **Hα**
1,8823125509249667924159877724252 **eV   Lambda$_{ad}$ (v/c= 0,0027191751)=hc/ E$_{k,ad}$ =658,68 nm** For the **wings**[6] of spectral line **Hα**
1,8960110852742780772396666918109 **eV   Lambda$_{id}$ (v/c= 0,0027191751)=hc/ E$_{k,id}$ =653,9212453565576417278357O 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 **4,56793859936185136193714765743 e+14** times per second and absorbs energy **4,56793859936185136193714765743 e+14** times per second (for spectral line **Hα**). Electron creates in the transmission medium, electromagnetic wave   **4,56793859936185136193714765743 e+14** times per second and absorbs energy **4,56793859936185136193714765743 e+14**   times per second (for spectral line **Hα**) - Beiser´s argument is unfounded.
Atom 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

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

The force acting on the moving electric charge is

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

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

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

$$F = F_{el} + F_{m} = QE + Q(v \times B)$$

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
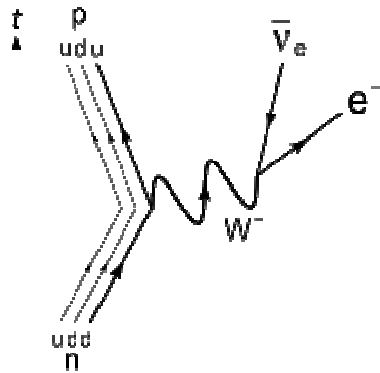
The Feynman diagram for beta decay of a neutron into a proton , electron , and electron antineutrino via an intermediate heavy W boson.
In the "stable" neutron, electron orbits around the center-of-mass with speed greater than 0,999994c.
If will start beta decay of a neutron, β electron has kinetical energy in direction of motion 80 398 MeV (it is W- boson), proton is moving at a speed 0,0233370828471411901983663943990065c, 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**	0,19314559172439827476506281953288 Muon neutrino < 170 keV = 0,17 MeV	5,44461745693884836504523246 4552e-4 0,51085321825892503086182184 5245 MeV	1+v/c=1,0233368828175491399522 [ln |1+v/c|- (v/c) / (1+v/c)]= =2,64049092631168143129 6567e

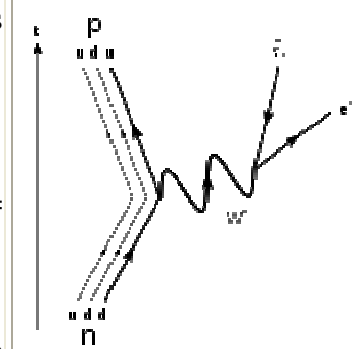| electron			
electron **Planck : 80 398 MeV = h*f** h =6,6260689633e-34 Js= 4,1356673310e-15 eVs f = 80 398 MeV / h = 8,0 398e+10 eV /4,1356673310e-15 eVs =19440151628578850990759246,829759 Hz =1,94401516285788509907592468297e+25Hz angular velocity of the β electron= =2*pí*f=122146075082029946177950744,23446 rad/s Re orbit = 0,99999364465781184c /122146075082029946177950744,23446= =299790552,71634398041510272/ /122146075082029946177950744,23446= Re orbit =2,45436091593620905607969474e-18 m/rad 42,850352057551791567501064480165*0,023336882817549139952204241510852c = 0,99999364465781183999999999996341c 0,99999364465781184c	98,697186837160259358230511606622 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=0,0233368828175491399522042 1- v/c=0,9766631171824508600477957 [ln l1-v/cl+ (v/c) / (1-v/c)]= =2,810061766229054172607610e-4 kinetic energy of proton = =0,263660231070038428385127 MeV $m_p / m_e =$ =938,27201323 /0,51099891013= = 1836,152670054228007830683 $(m_p / m_e)^{0,5} =$ 42,85035204119364067457096660409 $(m_p / m_e)^{0,5} =$ =42,85035205755179156750106448= = 1,67262163783e-27 /9,1093825e-31 Rp orbit = Re orbit / / 42,850352057551791567501	-4 0,247749873734600891500904MeV against the direction of movement = only energy of waves radiated by movement of proton 5,990565824226854176364e+19 Hz 0,2636602310700384283851274 MeV + +0,24774987373460089150090MeV =0,5114101048046393198860312 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=122146075082029946177 950744,23446 rad/s = angular velocity of the β electron in center-of-mass coordinates system Orbital speed of the proton =12214607508202994617795 rad/s* *5,727749710526967155e-20 m/rad = 6996221,46193102220205731201m /s= =0,02333688281754913995220424 15cOrbital speed of the electron= =42,8503520575517915675010644 * *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	5,45056089619770317642249978648e-4 0,51141087453081320114439047437297 MeV How energy of electron !!!!!!!!! I tis energy β electron in neutron too !??!!?? v/c =0,023336900365437361502580178294 1-v/c=0,9766309963456263849741982 [ln l1-v/cl+ (v/c) / (1-v/c)] = 0,00028100660594011835046899960813 kinetical energy of proton =	1+v/c=1,023336900365437361502580 178294878 [ln l1+v/cl- (v/c) / (1+v/c)]= =2,64049483679651967173250371e-4 0,247750240644449079625375 MeV 5,99057469606829649581e+19 Hz against the direction of movement of

=220490655320554843728072 57,596126 Hz =
=2,2049065532055484372807257596126e +25 Hz
angular velocity of β elektron =2*pí*f= 138538364588050870918387289,29769 rad/s

Re orbit = 0,999994396591c /

/ 138538364588050870918387289,29769=

=299790778,140242710678 /

/ 138538364588050870918387289,29769=

= 2,1639549379096690127802754e-18 m/rad

Radius of force reach of electron (v/c=0.99999 (electron in neutron W,Z):
r_e **=2,818292938435929031 0322993e-30 m**
…in the direction of movement
r_e **=5,8358575551536354084674977e-14 m**
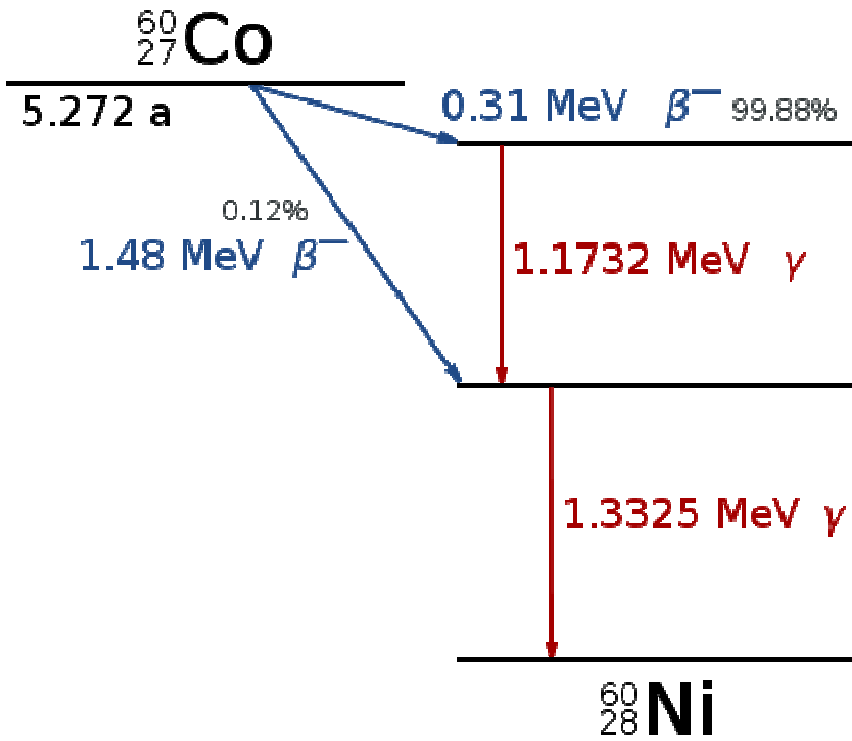**…against direction of movement**

=0,263660633886364121519014 97 MeV
Rp orbit = Re orbit /
/42,85035205755179156750106448016 =
=5,05002837550386332418e-20 m/rad
angle speed of proton =2*pí*f= 138538364588050870918387289,2976 9 rad/s = angle speed of β electron in the center- of- mass coordinates system speed of proton = =138538364588050870918387289,297 69 rad/s*
*5,05002837550386332 4181e-20 m/rad = 6996226,72265556484989308499 31m/s =0,0233369003654373615025801 78294878c
Radius of force reach of proton (v/c= =0,0233369 proton in neutron …W,Z)**:**
r_p**= 5,20949998231584295 4057e-15 m in the direction of movement**
r_p**= 6,08660273606561802 2025e-15 m against direction of movement**

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proton = only energy of waves radiated by movement of proton 0,263660633886364121519015 MeV+ +0,247750240644449079625375 MeV = = 0,511410874530813201144 3905 MeV

β electron is radiated from a neutron . Logically follows that , gamma rays are actually caused by the movement of a proton

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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

$^{60}_{27}\text{Co}$

5.272 a

0.31 MeV β^- 99.88%

0.12%
1.48 MeV β^-

1.1732 MeV γ

1.3325 MeV γ

$^{60}_{28}\text{Ni}$

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	$mc^2 [\ln |1+v/c|- (v/c) / (1+v/c)]$ 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
f =2,83678522981276996720798 38280397e+20 Hz **Re orbit = 42,850352057551791567501064480165* *Rp orbit= 42,850352057551791567501064480165* *8,699071365794650862607319 6142044e-15 m = Re orbit = 3,72758270598068691254857 83868524e-13 m**		0,00268572349418252610237987554703 **2,519939189865748959166990 9237MeV** ──────── v/c = **0,05172 ,** 1-v/c= 0,94828 [ln |1-v/c|+ (v/c) / (1-v/c)]= =0,00143539122553642070990525571 **kinetic energy of proton = 1,34678741495673444617107 00766414 MeV Planck : 1,1732 MeV = h*f f=1,1732 MeV / h =1,1732e+6 eV/ /4,1356673310e-15 eVs = f = 283678522981276996720,79838280Hz f =2,83678522981276996720798 3828e+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 = 0,0440845550630753494715308 55779**	0,001250383666418079291813899 3482 **1,1732 MeV γ ray ──────────- 1,346787414956734446171070 0766414 +1,1732 = =2,5199874149567344461710700 76641 β electron is radiated from a neutron . Logically follows that , gamma rays are actually caused by the movement of a proton**

		0,00306569519516290057528919136072,876456002715032480582914767473	0,001420163855695610856070594001
		v/c = **0,055242**, 1-v/c= 0,944758	**1,3325 MeV γ ray**
		[ln |1-v/c|+ (v/c) / (1-v/c)] = 0,00164564772927706190965458676942	**β electron is radiated from a neutron . Logically follows that , gamma rays are actually caused by the movement of a proton**
f= 3,2219709501581281804505953382738e+20 Hz	**=**	**kinetical energy of proton =1,544065208016166890430957 5 MeV**	
Re orbit 42,8503520575517915675010644801 65* *8,1806649831411803256308183480 4e-15 m =		**Planck : 1,3325 MeV = h*f**	
		f= 1,3325 MeV / h =	
		= 1,3325 e+6 eV/4,1356673310e-15 eVs	**_____-**
=3,5054374592485556864205100794 378e-13 m		**f= 32219709501581281 8045,0595338 Hz**	**1,5440652080161668904309575020503 MeV +1,3325 MeV =**
Re orbit =3,5054374592485556864205100 794378e-13 m		**f= 3,2219709501581281804505 9e+20 Hz**	**=2,8765652080161668904309575020 5**
f is electron frequency circulation in neutron around center of mass		**2*pí*f= =202442405341930027217 2,43422339Hz**	
		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= =0,04145741088180112570356472 7955	
		Greater speed of proton, smaller radius of the orbit of the proton (**in a center-of-mass system)**	
		1,3467874149567344461710700766 414 +1,1732= =2,519987414956734446171070077MeV	

		0,062061840279371195787669627082 35 58,230887823684317510169276 61 MeV	0,021315780198057949059220923086 81 =[ln |1+v/c|- (v/c) / (1+v/c)]
		v/c = **0,2385** 1-v/c= **0,7615**	[ln |1+v/c|- (v/c) / (1+v/c)]*
		[ln |1-v/c|+ (v/c) / (1-v/c)] =	*938,27201323MeV =

		0,04073252959733420964215285359831 kinetic energy of proton = =38,21819254924133012209363582 MeV 38,21819254924133012209363582MeV + +20 MeV = = 58,21819254924133012209363582 MeV	=19,99999999999999999999999999 MeV **Gamma rays The upper limit for such energies is about 20 MeV** **20e+6 eV/4,1356673310e-15 eVs = =4,83597891205722280382e+21Hz** **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=

=2,45436178807973022974828811359261e-18 m/rad

Rp orbit = Re orbit / 42,85035205755179156750106448016 5 = 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 =6996281,42929409568261376896149 32m/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 :

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

1,1732 MeV   =

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

[ln |1+v/c|- (v/c) / (1+v/c)] = 0,001250383666418079291813899348 2723

v/c= 0,05172   1+v/c= 1,05172   [ln |1+v/c|- (v/c) / (1+v/c)] =0,0012503322686461053924746198376 39

v/c = **0,05172**   1-v/c= 0,94828   [ln |1-v/c|+ (v/c) / (1-v/c)] =0,0014353912255364207099052557093 913

 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 :

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

1,3325 MeV =

= 938,27201323 * [ln |1+v/c|- (v/c) / (1+v/c)] ,   [ln |1+v/c|- (v/c) / (1+v/c)] = =0,0014201638556956108560705940006587

 v/c =0,055242 1+v/c= 1,055242   [ln |1+v/c|- (v/c) / (1+v/c)] =**0,0014200474658858386656346045912884**

$1 - v^2/c^2$ = 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)] = 2,6405393248504354747513935636936e-4

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

$\ln(1-v^2/c^2) =$ **-5,44768595879778748912292452646889e-4**

$v/c =$ **0,0233371** , $1-v/c = 0,9766629$
$[\ln|1-v/c|+ (v/c)/(1-v/c)] = 2,810114901159707332253368920969$1e-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	5,4506542226010139207004762484662**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 =0,6821555671006273161671553c) =** **=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** , $1-v/c = 0,9766629$ $[\ln|1-v/c|+ (v/c)/(1-v/c)] =$	2,64053932485043547475139356369**36e-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 *** ***2,64053932485043547475139356369**36e-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 =0,6821555671006273161671553) = =0,51099890997249598396127388955714** MeV **=free electron (for electron speed**

	= 2,810114901159703732253369209691e-4 **kinetic energy of proton =** **=0,26366521657187376826117133419276 MeV**	**v =0,6821555671006273161671553c) =** **=0,51099890997249598396127388955714** 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=

=2,45436178807973022974828811359261e-18 m/rad

Rp orbit = Re orbit / 42,8503520575517915675010644801 65 = 5,72775174585101770802769630636067e-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

=6996281,42929409568261376896149 32m/s= =0,02333708284714119019836639439 9065c =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) =0,51099890997249598396127388955714** MeV

0,05172	0,0026857234941825261023798755470303 **2,51993918986574895916699092374 89**	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 =** **1,346787414956734446171070076414 MeV** **1,346787414956734446171070076414 +1,1732 =** **= 2,519987414956734446171070076641 MeV=** **= mc² ln (1-v²/c²) +(2v²/c²)/ (1-v²/c²) =** **=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 = =** $$\frac{mc^2}{\cos^2\vartheta}\left[ln\left|1-\frac{v}{c}\cos\vartheta\right|+\frac{\frac{v}{c}\cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]=eU_{\text{mov}}=$$ **=938,27201323 MeV * [ln |1+v/c|- (v/c) / (1+v/c)] ,** **v = 0,05172c** **see you above** **mc² [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	0,0030656951951629005752891913607114 **2,8764560027150324805829147674735** 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** **1,544065208016166890430957502050 MeV+1,3325 MeV=** **=2,8765652080161668904309575020505 MeV=** **= mc² ln (1-v²/c²) +(2v²/c²)/ (1-v²/c²) =** **=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=** $$\frac{mc^2}{\cos^2\vartheta}\left[ln\left|1-\frac{v}{c}\cos\vartheta\right|+\frac{\frac{v}{c}\cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]=eU_{\text{mov}}=$$ **= 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** **mc² [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	0,01015168434851876083665316264402 **9,52504131136017869863144420892325**	0,00440108889523395095304303237116742 **4,12941853813535571255876317775622**
0,2	0,04251133881307820377875626817833 **39,8871994532495249129258372488854**	0,01565489012728795954505135848848 **14,6885452766249247622741330113344**
0,2385 **upper limit for speed of proton in neutron= 0,2385c**	0,06206184027937119578766962708235 **58,23088782368431751016927661268 MeV** v/c = 0,2385 1-v/c= 0,7615 [ln |1-v/c|+ (v/c) / (1-v/c)] = 0,04073252959733420964215285359807 **kinetic energy of proton =** **=38,2181925492413301220936358170 MeV** **Comment: mc² ln (1-v²/c²) +(2v²/c²)/ (1-v²/c²) =** **= in the direction of movement = *kinetic energy* of proton +** **+ energy of waves radiated by movement of proton =** **38,2181925492413301220936358170 MeV + 20 MeV =** **= 58,2181925492413301220936358170 MeV**	0,02131578019805794905922092308681 **Gamma rays The upper limit for such energies is about 20 MeV** **20** MeV = $$\frac{mc^2}{\cos^2 \vartheta}\left[ln\left|1 - \frac{v}{c}\cos\vartheta\right| + \frac{\frac{v}{c}\cos\vartheta}{1 - \frac{v}{c}\cos\vartheta}\right] = eU_{\mathrm{mov}} =$$ = = **938,27201323 [ln |1+v/c|- (v/c) / (1+v/c)] ,** **[ln |1+v/c|- (v/c) / (1+v/c)]=** =0,02131578019805794905922092308681 v/c= **0,2385** 1+v/c= 1,2385 [ln |1+v/c|- (v/c) / (1+v/c)] =0,02132931068203698614551677348404 v/c = **0,2385** 1-v/c= **0,7615** [ln |1-v/c|+ (v/c) / (1-v/c)] = 0,04073252959733420964215285359807 **kinetic energy of proton =** **38,2181925492413301220936358170 MeV** 1 - v²/c²= 0,94311775 , v²/c² =0,05688225 ln (1-v^2/c^2) = **-0,05856413669964335462239316730608**

0,3	0,10349151833095647532065947344229 **97,103195256615981530619973957697**	0,03159503369826028280472675611724 **29,644735876136367895740124416315**
0,4	0,206598993807603199680031694866389 **193,84605385115215744477303017213**	0,05075795090692721621887912450270606 **47,624764784872103514767224480511**
0,5	0,37898459421488573922744766067367 **355,59063819715545377935410145411**	0,072131774774831048644679782131016 **67,679225535833657944955762108731**
0,6	0,67871289737158048846740981938188 **636,81731662199200301303408474088**	0,09500362924573555365093703114834 **89,139246476552804316253364891193**
0,7	1,24822407418721479576565969052588 **1171,17371504979090234948879712888**	0,11886354517981745505507257495347 **111,52633783552238591841798542491**
0,8	2,53390430802357418914452736294886 **377,491496421448996748900500277**	0,14334222045767456374528669617442 **134,49399376968080492945211734271** / meson pí +- /
0,9	6,865584582652033024993603119937 **6441,78586836577261928908039072088**	0,16816967546078986517351766677177 **157,78890013268263163523366844813**
0,99	94,5854770155623800110969494429811 **88746,905941711606333662244494576**	0,19064720155047137913293235234906 **178,878933615426358354551050503199**
0,999	992,285141901598657225076802215722 **931033,37779022920267003749645638**	0,19289718058079427713077657976902 **180,99002596993270707595628949319**
0,9999	9989,98278180858378340824119339138 **9373321,256820575726953580735496488**	0,19312218055996614431315921000012 **181,201137153367002965348607548222**
0,999994	166653,8360612584903928772884476777 **156366630,2736993773883555870840777**	0,193145680559945313917252371531088 **181,2231865456583633878447202663888**

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

20 MeV =

= **938,27201323 * [ln |1+v/c|- (v/c) / (1+v/c)] ,**
[ln |1+v/c|- (v/c) / (1+v/c)] =0,02131578019805794905922092308681

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**

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	0,01015168434851876083665316264402 **0,0051874996380768658673878930679016 MeV**	0,0044010888952339509530430323716742
0,2	0,042511338813078203778756268178333	0,015654890127287959545051358487848
0,3	0,1034915183309564753206594734422	0,031595033698260282804726756111724
0,4	0,20659899380760319968003169486638	0,050757950906927216218879124502706
0,5	0,37898459421488573922744766067367 **0,19366071459986691576770514278552 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 **0,34682155084805217124241945172775 MeV**	0,095003629245735553650937031148342
0,7	1,248224074187214795765659690525	0,11886354517981745505507257495347
0,8	2,5339043080235741891445273629486 **1,2948223397737582250000519595204 MeV**	0,14334222045767456374528669617442 **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	6,8655845826520333024993603119937 **3,5083062391405199226056377244506**	0,1681696756460789865173517666717 **0,0859345209720619657182617171105777**
0,99	94,585477015562380011096949442981	0,19064720155047137913293235234906
0,999	992,28514190159865722507680221572	0,192897180580794277130776657976902
0,9999	9989,9827818085837834082411933913 **5104,8703137216519036004032226683 MeV**	0,19312218055996614431315921000012
0,999994 **W+-**	166653,83606125849039287728844767 **85159,9285962867805069369911588 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
$\dfrac{v}{c}$	$\left[ln\left|1 - \dfrac{v}{c}\right| + \dfrac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$ **kinetic energy of proton in direction of motion of proton**	$\left[ln\left|1 + \dfrac{v}{c}\right| - \dfrac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$ **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

$\dfrac{v}{c}$	$\left[ln\left\|1 - \dfrac{v}{c}\right\| + \dfrac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$	$\left[ln\left\|1 + \dfrac{v}{c}\right\| - \dfrac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$
	kinetic energy of proton in direction of motion of proton	**kinetic energy of proton** against **direction of motion of proton**
0,5111	0,32981074951021491557976368704646 c quark: 309,452195927844585291MeV 1.16–1.34 **GeV**	0,07460743427266448931608258299818 s quark: 70,0020675569378111146930701620**MeV**
0,6668	0,90218811150262740395503144610525 c quark: 846,49785569 **MeV** 1.16–1.34 GeV	0,11085762440585416420687015655648 s quark: 104,0146 **MeV**
0,6821555671006273161671553	1,000000000000000000000002540294 proton 938,27201323 **MeV**	0,11455138503597051915497991380189 107,48035865598495497447128210228 **MeV** muon ??
0,68235958021424280152472	1,00137865656415237122738835717 32 neutron = 939,5655681 **MeV**	0,11460056876623030010684 50497695 107,52650637359396091907658895042 **MeV** muon ??
0,713	1,23604749426877325552441352 9431 c quark: 1160 **MeV** 1.16–1.34 **GeV**	0,12201738104659464824870350196726 s quark=114,485493763640 **MeV**
0,72585	1,35355827716301434378382094 04184 c quark: 1270 **MeV** 1.16–1.34 **GeV**	0,12514431408438967945446850497659 s quark: 117,41941 **MeV**
0,73333	1,42815727326988258696780184 68163 c quark: 1340 MeV 1.16–1.34 **GeV**	0,12696860023316592749751861919307 s quark= 119,1311**MeV**

0,7805	2,03940560956953545777029721598551 c quark:1913,517207083363387638 MeV/c^2 1.16–1.34 **GeV**	0,138534212502895591685304897083792 s quark: 129,982774 **MeV**
0,9928305	**Higgs Boson** /p: 133,543358276710292187475017240361 **Higgs Boson 125300 MeV/c²**	**0,191354813279005033975005068774** **179,542872167240022072027**5MeV/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/c²**

PROTON	Front of proton	Behind proton
$\dfrac{v}{c}$	$\left[ln\left\|1-\dfrac{v}{c}\right\|+\dfrac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of proton in direction of motion of proton**	$\left[ln\left\|1+\dfrac{v}{c}\right\|-\dfrac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of proton** against **direction of motion of proton**
0,9928305	**Higgs Boson** /p: 133,543358276710292187475017240361 **Higgs Boson 125300 MeV/c²**	**0,191354813279005033975005068774** **179,542872167240022072027**5MeV/c^2
0,994637	180,22492157457995929571290469898 *Top quark:* **169 100MeV**	0,1918064337864411229060102959 3852 **179,96660877927080426588414**8 **MeV**
0,994766	184,80781431716241834344540316264 *Top quark:* **173 400MeV**	0,1918386835588782289730044404 1866 **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
$\dfrac{v}{c}$	$$\left[ln\left\|1 - \frac{v}{c}\right\| + \frac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$$ **kinetic energy of proton in direction of motion of proton**	$$\left[ln\left\|1 + \frac{v}{c}\right\| - \frac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$$ **kinetic energy of proton** against **direction of motion of proton**
0,8665	4,47631384159216930243 6394 4,2 GeV *Bottom quark*	0,1598271409905030872176 69575 **149,961333345954387954253 11140944 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
$\dfrac{v}{c}$	$$\left[ln\left\|1 - \frac{v}{c}\right\| + \frac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$$ **kinetic energy of elektron in direction of motion of electron**	$$\left[ln\left\|1 + \frac{v}{c}\right\| - \frac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$$ **kinetic energy of elektron** against **direction of motion of electron**

0,0799086445 Kirchner for U_mov=1638,0 V	0,0035662838516074059905946482812711	0,0028807043006710563136248786 8874
0,082238621 Kirchner for U_mov =1735,96V	0,0037899888666338791965735655270531	0,0030423323177703191690807846773952
0,202205081 Perry,Chaffee for U_mov =10761,70903 V	0,0275512538565329226209600 2021821	0,0159622738329496654284988738 60349
0,269608445 Perry,Chaffee for U_mov =19623,64596 V	0,0549541330513396852437235114 50052	0,026352956168022961852416332 16709
0,682155567100627316 1671553 **Electron**	**1,000000000000000000000002540294** **0,51099890997249598396127388956** MeV	**0,1145513850359705191549799138 0189** **58,53563288922062294904123370199 keV**
0.9	6,6974149070059543159820085453156	0,168169675646078986517351766677
0.99	94,39482981401190863196401709 0631	
0,9953098334237836613341	206,8497563051341909972105487 3516	
0,995308032046	206,7682822374468565674518970 1043 **Muon 105,658366838 MeV =** **= kinetic energy of elektron in direction** **of motion of electron**	0,1919741907309480619762709944 3559 **Muon neutrino** **98,0986022063665017156014631169 88 keV** **= kinetic energy of elektron** against **direction of motion of electron < 170 keV**
0.999	992,09224472101786294794602563595	
0,99971316674	3477,1889439759399848663533204024 **Tauon 1776,84±0.17 MeV = kinetic** **energy of elektron in direction of motion** **of electron**	0,1930754722354370554950579271201 **Muon neutrino** 98,0988323306154745516047829172 92 **keV = kinetic energy of elektron** against **direction of motion of electron < 170 keV**
0,9999	9989,7896596280238172639280341813	0,1930996793224037036883154537 4951
0,99999	99987,4870745350297715799100 42727	0,1931446805599453302507217057 2902
0,999992	124987,26393098371556182414374764	0,1931451805599453200839627884 3204
0,99999364465781184	157334,97358013414086695519224486 **W+ BOSON =** 80 398±0.25 MeV	0,1931455917243982747650628195 3288 **Muon neutrino** **98,69718683716025935823051160 6622 keV** **< 170 keV**
0,999999432258918	176123,54940648581389887129681009	**0,19314576120724031322974724564287**
0,999994396590953	**178449,6957242200052702749233 6062** **BOSÓN Z = 91 187,6 MeV = 91, 187,6 GeV**	**0,19314577970768356308259999253441** **Muon neutrino** **98,6972828964141347372324473125 7 keV < 170 keV**

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

$\dfrac{v}{c}$	Front of electron, proton, neutron, deuteron, He-3, α-particle $$\left[ln\left|1-\frac{v}{c}\right|+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$$	Behind of electron, proton, neutron, deuteron, He-3, α-particle $$\left[ln\left|1+\frac{v}{c}\right|-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$$	Decay modes
Neutron **0,58360094975211166689581**	**K+/n0 :** 0,52543123815451982308 73 **Kaon K+** **493.677 MeV/c2**	**/n0 :** 0,09117355136082414012969482667 85,66351226708159339825475 83 **MeV/c2** f =2,07133460116943425312851e+22 Hz …gamma rays **γ + γ**	**μ+ + νμ** or **π+** + **π0** or **π0 + e+ + νe**
Neutron **0,58484084562020497175**	**K0/n0 : 0,52962147343915804715590191755369** **K0** **497,614 MeV/c2**	**?/n0 : 0,09146217425086310545335 4510569334** 85,9346923419211170942161 44 **MeV/c2** f = 2,07789170649114392118234 14e+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: : 0,58309194091818769891623293001713 Eta meson η 547,853 MeV/c2**	**γ ? /n0 :** 0,09496502619576292565347519 6132505 89,22585075434455074110 **MeV/c2** f=2,15747156630740041065976e+22Hz…gamma rays **γ + γ**	**γ** + **γ** or **π0 + π0 + π0** or **π+ + π0 + π−**
Neutron **0,68499502942048864**	**η′(958)/n0: : 1,0193862207063241677384071561382** **Eta prime meson η′(958) 957,78 MeV/c2**	**γ ? /n0 :** 0,11523617467713157476763855 6 108,27192004399275268448921 **MeV/c2** f = 2,61800349281677896129637 8e+22Hz …gamma rays **γ + γ**	**π+ + π− + η** or **(ρ0 + γ) / (π+ + π− + γ)** or **π0 + π0 + η**
Alpha particle **0,74079510897880611018 9**	**Λ0b5620,2/α:** **1,50781544803677967917475460937 45** **bottom Lambda Λ0b 5620,2MeV/c2**	**/α:** 0,12879211144543390135241844828114 480,05704258308624807846824 7 **MeV/c2**	See **Λ0b decay modes**
Alpha particle **0,753304289775682**	**Ω−b /α:** 1,65397712486152569697027902330 76 bottom Omega **Ω−b 6165 MeV/c2**	**K+ /α:** 0,13185382624286629129216216386684 491,46921476034714977734838317031 **MeV/c2** 2,20778523965285 **MeV/c2** less than K+ mezón 493,677 **MeV/c2**	**(Ω− +J/ψ** seen)
		K+ 493,677/α: 0,13244614197078588654692405272934	**μ+ + νμ** or **π+ + π0** or

			π0 + e+ + ve
0,76	1,739550311026520918277625358595	0,133495627231878595513070972610 93	
		K0, K0S, K0L 497,614/α: 0,1335023800797903247430223923 2303	π± + e∓ + ve or π± + μ∓ + νμ or π0 + π0 + π0 or π+ + π0 + π−
Neutron 0,8103668245118	Σ+c//n0 : 2,61067516629136393644212544978 13 2452,9 MeV/c2	(π0/n0: 0,1436585501770159947294269) (π+ /n0 : 0,1485475979299) 0,14590373087681143063739535698886 137,08609408352138674567554995853 MeV/c2 .... pion pi π0	Λ+c + π0
	Σc (2455) /n0 : 2,61291024284634719692704555 99951		
Proton 0,8105263656822	Σ+c/ p+ : 2,61427377049982208272571445939 42 2452,9 MeV/c2	0,14594317894483805192194380 1563 136,93440513896538769387243389314 MeV/c2 .... pion zero π0	Λ+c + π0
Neutron 0,821091179644426	Ω0c //n0 : 2,86856036046658407660272188 52177 Charmed Omega Ω0c 2695,2 MeV/c2	π+ /n0 : 0,148557194855674546931345094 31545 139,57919697038852205221964844453 MeV/c2 ...... pion pi +-, π +,π − π - = 139,57018 +- 0,00035 MeV/c2	See Ω0c decay modes
	Ωc0 = 2695,2 Ωc0 /p+ : 2,87251443916512034719619047 45908		
Proton 0,8212451756	Ω0c / p+ : 2,87251443916512034719619047 45908 2,8725144993078885300477894391 06 2,695.2±1.7 MeV/c2 6,9±1.2×10−14 s	Proton v/c= 0,82188 π+ / p+ : 0,148752358758858302381951172 40016 139,57017509117216095767602139546…. MeV/c2 139,57 = π- +	See Ω0c decay modes
Electron 0,99642558425145955450 2	π-/e- : 273,1320474902355857311584919 2 139,5701835 MeV/c^2 pi minus π- 139,57 MeV/c^2	νμ/e- : 0,192253577576789948957123447070 72 98,24137206705239513171169380 1718 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 **ve, 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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