Physics is easy

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Abstract. *In the present paper we show, that 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 .*

Similarly hyperons, mesons and quarks can be replaced by proton and neutron (or alpha particle respectively) moving at different speeds from 0.1c up to 0.999.. c . While, the neutron is composed of proton and electron orbiting around it.

Thus, all particles, which are currently known, can be replaced by the various fast moving electron or proton.

Electron and proton are the only stable fundamental elementary particles.

Keywords: mass, kinetic energy, potential energy. leptons. hyperons, mesons, quarks

PACS number: 14.20., 14.40., 14.60., 14.65., 14.70.

Introduction

Function	Classical physics	Theory of relativity	Neoclassical physics
Mass	$m = m_o = const$	$m = \frac{m_o c^2}{\sqrt{(1-\frac{v^2}{c^2}}}$	$m_\vartheta = \frac{eU_{still}\left(1-\frac{v}{c}\cos\vartheta\right)^2\cos^2\vartheta}{c^2\left[ln\lvert 1-\frac{v}{c}\cos\vartheta\rvert+\frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]}$ Kirchner, Perry,Chaffee
The kinetic energy	$\frac{m_o v^2}{2}$	$\frac{m_o c^2}{\sqrt{(1-\frac{v^2}{c^2}}}-m_o c^2$	$\frac{m_\vartheta c^2}{\cos^2\vartheta}\left[ln\lvert 1-\frac{v}{c}\cos\vartheta\rvert+\frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]$

The field energy	eU	eU	$eU_{\mathbf{mov}} = eU_{\mathbf{still}} \left(1 - \frac{v}{c}\cos\vartheta\right)^2$
Kinetic energy	$\frac{m_o v^2}{2}$	$\frac{m_o c^2}{\sqrt{(1-\frac{v^2}{c^2}}} - m_o c^2$	$m_{\vartheta=0^o} c^2 \left[ln\left|1-\frac{v}{c}\right| + \frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$
Potential energy	eU	eU	$eU_{\mathbf{mov}} = eU_{\mathbf{still}} \left(1 - \frac{v}{c}\right)^2$
Mass	$m = m_o = const$	$m = \frac{m_o c^2}{\sqrt{(1-\frac{v^2}{c^2}}}$	$m_\vartheta = \frac{RevB_{\mathbf{still}} \left(1-\frac{v}{c}\cos\vartheta\right)^2 \cos^2\vartheta}{2c^2\left[ln\left\|1-\frac{v}{c}\cos\vartheta\right\| + \frac{\frac{v}{c}cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right]}$ Dunnington

Author	m_{180^o} **$x10^{-31}$ kg**	m_{0^o} **$x10^{-31}$ kg**	$\frac{m_{180^o}+m_{0^o}}{2}$ **$x10^{-31}$ kg**	$m = \frac{m_o}{\sqrt{(1-\frac{v^2}{c^2}}}$ **$x10^{-31}$ kg**
Dunnington v/c = 0.074482454		7.04625552		
Kirchner 0,0799086445 = v/c = 8lf/c U_{mov} = $1638{,}0V$	10,13640990421938 8887775432133238	8,187794583790175 1741831584998869	9,162102244004782030 9792953165621	9,138605667421429030 3331706775523
Kirchner 0,082238621 = v/c = 8lf/c U_{mov} = $1735{,}96V$	10,17189834336352 067632490619856	8,165273343025544 6048147764201549	9,168585843194532640 5698413093572	9,140343536329612451 8928769788029
Perry,Chaffee 0,202205081=	12,01864304847865 9654543669177524	6,963199295367214 8036851585036311	9,490921171922937229 1144138405755	9,301521821770204700 1820356873396

v/c = 8lf/c U_{mov} = 10761,70903V				
Perry,Chaffee 0,269608445= v/c = 8lf/c U_{mov} = 19623,64596V	13,274534740032694245198844567851	6,365731069365884542129544815687 4	9,820132904699289393664194691769	9,459673544199440899 4161064377994

Subject and Methods

Calculation of the kinetic energy of a body moving at the velocity of v , [4] p. 51-52:

$$T_{kin} = \frac{mc^2}{\cos^2 \vartheta}\left[\ln\left|1-\frac{v}{c}\cos\vartheta\right| + \frac{\frac{v}{c}\cos\vartheta}{1-\frac{v}{c}\cos\vartheta}\right] \tag{3.11}$$

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

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

$$T_{kin_{\uparrow\uparrow}} = mc^2\left[\ln\left|1-\frac{v}{c}\right| + \frac{\frac{v}{c}}{1-\frac{v}{c}}\right] \tag{3.12}$$

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

$$T_{kin_{\uparrow\downarrow}} = mc^2\left[\ln\left|1+\frac{v}{c}\right| - \frac{\frac{v}{c}}{1+\frac{v}{c}}\right] \tag{3.13}$$

Comparing the kinetic energies of the baryon and proton we calculate the speed of proton:

2286,46 MeV=

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

=938,272013096211620763557637 26457 MeV * **[ln |1-v/c|+ (v/c) / (1-v/c)]**

[ln |1-v/c|+ (v/c) / (1-v/c)] = 2,436883939930054640270555968 1979

v/c= 0,8022863362

Kinetic energy of proton in direction of motion of proton with speed 0,8022863362c =

= kinetic energy of Lambda hyperon = 2286,46 MeV

X = 938,272013096211620763557637 26457 MeV/c² * 2,436883940296256952562771028967

X = 2286,460000343597380754904187 2897 MeV/c² (**Λ Lambda + c = "unstable particle with** rest mass= 2286,46 MeV/c²").

v/c=0,8022863362 (1-v/c) = 0,1977136638

[ln |1-v/c|+ (v/c) / (1-v/c)] =2,436883940296256952562771028967

v/c=0,8022863365 (1-v/c) = 0,1977136635

[ln |1-v/c|+ (v/c) / (1-v/c)] =2,436883946453372206926479252 7779

Comparing the kinetic energies of the meson and proton we calculate the speed of proton:

134,97666 MeV=

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

=938,272013096211620763557637 26457 MeV * **[ln |1+v/c|- (v/c) / (1+v/c)]**

v/c=**0,8022863362** (1+v/c) = **1,8022863362**

[ln |1+v/c|- (v/c) / (1+v/c)] =**0,143906837091775693127965701 47315**

134,97666 /938,272 029 = 0,143856638403530624699033844 9064=[ln |1+v/c|- (v/c) / (1+v/c)]

X = **938,272 029** * 0,143906837091775693127965701 47315=

=135,023760025072838804057735363 48 MeV (**π⁰ = "unstable particle with rest mass= *134,*9766(6) MeV/c²").**

Against direction of movement of a proton traveling at a speed v = 0.8022863362 c arises at the moment (8.4×10^{-17} s) meson pion π^0

(π^0 = "unstable particle with rest mass= *134,*9766(6) MeV/c^{2}").

In direction of movement of a proton traveling at a speed v = 0.8022863362 c arises at the moment (2 x 10-13 s) charmed baryons Λ Lambda + c

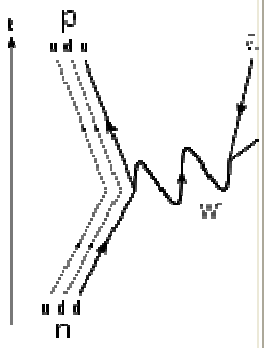
(Λ Lambda + c = "unstable particle with rest mass= 2286,46 MeV/c^{2}").

Results

1. 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	0,00356628385160740599059464 82812711	0,00288070430067105631362487868874
0,082238621 Kirchner for U_mov =1735,96V	0,00378998886663387919657356 55270531	0,00304233231777031916908078467773952
0,202205081 Perry,Chaffee for U_mov =10761,70903 V	0,02755125385653292262096002 021821	0,01596227383294966542849887386 0349
0,269608445 Perry,Chaffee for U_mov =19623,64596 V	0,05495413305133968524372351 1450052	0,02635295616802296185241633216709
0,6821555671006273161 671553 **Electron**	1,00000000000000000000000025 40294 **0,5109989099724959839612738895 5714** MeV	0,1145513850359705191549791 91380189 **58,535632889220622949041233701 99 keV**
0.9	6,69741490700595431598200854 53156	0,16816967564607898651735176667 7
0.99	94,39482981401190863196401709 0631	
0,9953098334237836613 341	206,84975630513419099721054873516	
0,995308032046	206,76828223744685656745189701043 **Muon 105,658366838 MeV = = kinetic energy of elektron in direction of motion of electron**	0,19197419073094806197627099443559 **Muon neutrino 98,09860220636650171560146 3116988 keV = kinetic energy of elektron against direction of**

		motion of electron < 170 keV
0.999	992,092244721017862947946025 63595	
0,99971316674	3477,18894397593998486635 33204024 **Tauon 1776,84±0.17 MeV = kinetic energy of elektron in direction of motion of electron**	0,193075472235437055495057 9271201 **Muon neutrino** 98,098832330615474551604782917292 **keV = kinetic energy of elektron against direction of motion of electron < 170 keV**
0,9999	9989,78965962802381726392803 41813	0,193099679322403703688315453 74951
0,99999	99987,4870745350297715799100 42727	0,193144680559945330250721705 72902
0,999992	124987,263930983715561824143 74764	0,193145180559945320083962788 43204
0,99999364465781184	157334,973580134140866955192 24486 **W+ BOSON =** 80 398±0.25 MeV	0,193145591724398274765062819 53288 **Muon neutrino 98,697186837160259358230511606622 keV < 170 keV**
0,99999432258918	176123,549406485813898871296 81009	**0,193145761207240313229747245642 87**
0,999994396590953	**178449,695724220005270274923360 62 BOSÓN Z = 91 187,6 MeV = 91, 187,6 GeV**	**0,193145779707683563082599992534 41 Muon neutrino 98,697282896414134737232447312 57 keV < 170 keV**

ELECTRON	Front of elektron	Behind elektron	Decay modes
$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **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**	
0,999993644657 81184	157334,97358013414086695 519224486 **W+ BOSON =** 80 398±0.25 MeV **= kinetic energy of elektron in direction of motion of electron**	**0,193145591724398274765062 81953288 Muon neutrino < 170 keV = 0,17 MeV 98,697186837160259358230511 606622 keV = kinetic energy of elektron against direction of motion of electron**	 Feynman´s diagram

		< 170 keV = 0,17 MeV	**beta decay** of neutron
0,999994396591	178449,69572422000527027 **BOSÓN Z 91 187,6 MeV/c^2 = 91, 187,6 GeV = kinetic energy of elektron in direction of motion of electron**	0,1931457797076835630826 **Muon neutrino=** 98,69728289641413473723 24 keV = **kinetic energy of elektron against direction of motion of electron** < 170 keV = 0,17 MeV	

2. Hyperons, mesons and quarks can be replaced by proton and neutron (or alpha particle respectively) moving at different speeds from 0.1c up to 0.999.. c . :

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**
0,707447972108776418	1,18908265868268502046256244 **Lambda hyperón 1115,683 ± 0.006 MeV = kinetic energy of proton in direction of motion of proton = Lambda hyperón**	0,12066922459109591169238852396122 **113,22055831561348098831811 5925MeV**
0,716976187625	**1,27110473634861142409436 8008 1192,642 MeV = kinetic energy of proton in direction of motion of proton = SIGMA nula**	**0,12298397285633670056675230839888 115,39241980693870960350237040417 MeV**
0,8022863362	**2,43688394029625695256277 1 Lambda hyperón 2286,46 MeV = kinetic energy of proton in direction of motion of proton = charmed Lambda**	**0,14390683709177569312796570147315 135,02375773640895537120363794 46 MeV = kinetic energy of proton against direction of motion of proton = pion π^0: 134.9766(6) MeV**
0,8914255044669		0,16603254358400254680565533834121

	5,9899473943163580287033529346064 ***5620,2 ± 1.6*** **MeV** **bottom Lambda Λ0b**	**155,78368890804656430618186188992 MeV**
0,81056695762	2,615190441312234141034734660796 8 **Sigma 0 c(2455)+ hyperon 2453,76 MeV**	0,14595321581628735689454034296 54 **136,943817621813771989228117916 04 MeV**
0,813524	2,683167656321633702604972666239 **Sigma c (2520)+ hyperon 2517,5 MeV**	0,14668452255227892661580500182567 **137,62998226518340186897401436 33 MeV**
0,819183027	2,820184299506187549145805370506 6 **hyperon Chí 0 c (2645) 2646,1MeV**	0,14808481506355806690587395601792 **138,94383753866483044589965432297** **$\pi^{\pm}$: 139.57018(35) MeV**
0,81920429	2,820717194011214983397939795768 4 **hyperon Chí c (2645)+ 2646,6MeV**	**0,14809007830452767245644806845057** **138,94877589036479270259695500946 MeV**
0,825051	2,972698706845039232106677880434 3 **hyperon Chí 0 c (2790) 2791,9 MeV**	0,14953782531546511136343667740423 **140,30715639277108660929956390 34 MeV**
0,825555765	2,986340806173741548961319167136 4 **hyperon Sigma 0 c(2800)** 2802 **MeV**	0,14966286064342747247827858815071 **140,42447354164647621231116941 77MeV**
	hyperon Chí c(2815)+ 2816,5 **MeV**	
	Sigma c(2455)+ hyperon 2452,9 MeV	
0,81056695762	2,615190441312234141034734660796 8 **Sigma 0 c(2455)+ hyperon 2453,76 MeV**	0,14595321581628735689454034296 54 **136,943817621813771989228117916 MeV**

alpha particle	**Front of alpha particle**	**Behind alpha particle**	**Decay modes**
$\frac{v}{c}$	$\left[ln\lvert 1-\frac{v}{c}\rvert+\frac{\frac{v}{c}}{1-\frac{v}{c}}\right]$ **kinetic energy of alpha particle in direction of motion of alpha particle**	$\left[ln\lvert 1+\frac{v}{c}\rvert-\frac{\frac{v}{c}}{1+\frac{v}{c}}\right]$ **kinetic energy of alpha particle against direction of motion of alpha particle**	
0,6187	0,658438059111383627726 2,45402 GeV	0,09940305771684366457572019 11 370,51288079692915643520739 73 MeV	
0,6821555671006273161671	1,000000000000000000000000 25 **3.727 379 109 93 GeV**	0,11455138503597051915497991 38019 **426,97643959662451472160904683 06 MeV**	**K^+ ,K^-** 493.7 MeV???
0,74492	1,551644483964870224849 **5,7929 GeV** Ξ−b	0,12980088547686883016759403 45 **483,81710897689720379344698508 37 MeV**	**K^+ ,K^-** 493.7 MeV???
0,7533	1,6539771829423002810159 **6,165 GeV** Ω−b	0,13185277503099003952812808 68 **491,46527923681218170304958558 57 MeV**	K^- 493.7 (Ω^- + J/ψ seen)

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	0,00187049880394503298617776261248 76 ***Down quark: 1,7550*** MeV	0,00159868351485434617944156923151 07 ***Up quark:*** 1,5 MeV
0,075	0,00311953961136922259672105451181 09 ***Down quark:*** 2,92697671 MeV	0,00255321971916100434131704830326 92 ***Up quark:*** 2,4MeV
0,081622	0,00373026153466014108536366154019 17 *Down quark:* 3,5 MeV	0,00299917404444244943223283169370 18 *Up quark:* 2,81404106871 MeV
0,08878	0,00445890135114829223121321088077 56 *Down quark:* 4,18366235 MeV	0,00351710373267956159477145230932 36 *Up quark:* 3,3 MeV
0,094686	0,00511569184940226624325622138376 19 *Down quark:* 4,8MeV	0,00397152784836062561964734521684 54 *Up quark:* 3,72637 MeV
0,105065	0,00639473405941738471776627692604 29 *Down quark:* 6 MeV	0,00482830150265965022910406572959 24 *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: 309,452195927844585291MeV 1.16–1.34 GeV**	0,07460743427266448931608265829981 8 **s quark: 70,00206755693781114693070162 0MeV/c²**
0,6668	0,90218811150262740395503144610525 **c quark: 846,49785569 MeV 1.16–1.34 GeV**	0,11085762440585416420687015655648 **s quark: 104,0146** MeV
0,68215556710062731616715 53	1,00000000000000000000000002540294 **proton 938,27201323 MeV**	0,11455138503597051915497991380189 **107,48035865598495497447128210228 MeV/c² 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= 119,1311MeV**
0,7805	2,03940560956953545777029721598 55 **c quark:1913,517207083363387638** MeV/c² **1.16–1.34 GeV**	0,13853421250289559168530489708379 **s quark: 129,982774** MeV

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**
0,994637	180,22492157457995929571290469898 ***Top quark:* 169 100MeV**	0,191806433786441122906010295938 52 **179,96660877927080426588414 8 MeV**
0,994766	184,80781431716241834344540316264 ***Top quark:* 173 400MeV**	0,191838683558878228973004440418 66 **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***	0,159827140990503087217669575 **149,96133334595438795425311140944 MeV**

Discussion

Thus, all particles, which are currently known, can be replaced by the various fast moving electron or proton.

Electron and proton are the only stable fundamental elementary particles.

t -> b -> c -> s -> u <-> d

This decay of quarks actually means a reduction of the speed of proton.

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