cosmo
edu

Digitally signed by cosmoedu
DN: ou=Non-Commercial, ou=SecureZIP, o=cosmoedu.net, cn=cosmoedu, email=maindesk3@cosmoedu.net
Date: 2008.12.22 17:39:00 -03'00'

Lecture by Dr. Enzo Bonacci about a possible extension of Einstein's Special Relativity

Enzo Bonacci was born in Brescia (Italy) in 1972 and spent there his childhood.
At the end of the 70's his family moved to Latina, city where he still lives and works; his school marks were so excellent to deserve the City Medal conferred by the Mayor.
During his scientific high school he received a prize that used to study in Cambridge (UK), where he was extremely impressed with Newton's manuscripts on maths and physics.
After graduating in Chemical Engineering from "La Sapienza" University of Rome, he spent his university prize to travel the world and to achieve diplomas in numerous foreign languages.
He was chosen to do his national service at the office of the Under Secretary of Defence. In spite of his scientific education he has never neglected his artistic side, writing poems and novels selected by international literary contests and becoming a columnist for some newspapers.
Member of the *ODI* (Italian Order of Engineers) since 2001, he has become technical-scientific consultant for important boards.
After qualifying in *mathematics* and *physics*, he has been teaching at Scientific High School since 2001, holding several posts like *Responsible for Public Relations* and *Secretary of the School Council*.
In November 2003 he became responsible for the scientific project *Evolution of Rational Thinking and Epistemological Problems*. During 2004 he became responsible for the IFTS project *Transformation of Agroindustrial Products*. In January 2005 he was elected *Secretary of AEDE-Latina* (European Association of Teachers).
In October 2007 he got the cover of BLU magazine about his effort to extend Relativity and became member of the *IOP* (Institute of Physics, MInstP).
In 2008 he was selected among the 280 CBEL mathematicians and he was awarded with the Honorary Ph.D. in Theoretical Physics by the Cosmopolitan University.

Extending Einstein's Special Relativity

Mr. Enzo Bonacci (Italy), Honorary Doctor[*]

1 SYNTHESIS

The violation of CP symmetry matter-antimatter, the dark matter's presence in the Universe, the quantum time arrow and the nature of neutrinos explained by a new gauge theory based upon an extension of Lorentz equations in order to complete the Relativity.

2 INTRODUCTION

Keywords: transmass, cismass, nilmass, cismatter, cisantimatter, nilmatter, nilantimatter.

Abstract: Particle's time-interval Δt, its length Δx and its mass m are linked to their respective values at rest by Lorentz equations: $\gamma=\Delta t/\Delta t_0=\Delta x_0/\Delta x=m/m_0$.

The relativistic factor γ is linked to $\beta=v/c$ so that it's impossible to get a time-contraction, a space-stretching and an energy decreasing below its own mass at rest, because condition $\gamma<1$ requires complex velocities.

Lorentz equations usually depend on term β, ratio between particle's velocity and speed of light, but we are allowed to choose as independent variable $\alpha=m/m_0$, ratio between particle's moving and rest mass.

Paper's main hypothesis is the existence of a particle's energy level, defined *cismass*, whose total energy absolute value is lower than mass at rest, where Lorentz equations intended as $\alpha=m/m_0=\Delta t/\Delta t_0=\Delta x_0/\Delta x$ are still valid, changing only the relationship between velocity and mass $\beta=\beta(\alpha)$.

Transmass defines the ordinary energy condition, *i.e.* $|m|>|m_0|$.

Cismass energy level is "Lorentz-invariant" because variations of $\Delta x/\Delta x_0$ and $\Delta t/\Delta t_0$ in function of α are described by the same proportionality principles (respectively direct and inverse) without discontinuities in m_0.

Assuming conserved their corresponding *transparticles' charge* and *spin*, *cisparticles'* mass is $|m|<|m_0|$.

By *algebraic symmetry*, equation $\beta^2=1/(1-\alpha^2)$ for *cismass* replaces the ordinary equation $\beta^2=1-(1/\alpha)^2$ for transmass, so completing the range of real velocities with the interval between $v=c$ and $v=\infty$ missing in Theory of Relativity.

Although described by real *mass, charge, spin* and *velocity*, *cisparticles* do not belong to our ordinary Universe, i.e. *STL (Slower Than Light)*, because are *tachyons*, *i.e. FTL (Faster Than Light)*.

As far as *kinetic energy* is concerned, while *transparticles' mass* grows to infinite when its *velocity* increases to unattainable limiting *c*, *cisparticles' velocity* grows to infinite when its *cismass* increases to unreachable m_0.

As *transmass* consists of *matter* and *antimatter*, analogously *cismass* is divided into *cismatter* and *cisantimatter*, whose own times pass respectively by ordinary direction and its opposite.

For energies between $-m_0c^2$ and $+m_0c^2$ the unique particle belonging also to our Universe is the one at $v=c$, *i.e.* whose mass is $m=0$, although its rest mass is $m_0\neq0$.

This *nilmass* should conserve the *spin* of reference particle (usually $\pm½$) and its eventual *charge*, so that we may distinguish between *nilparticles* and *nilantiparticles*.

(*) Ph.D. Honoris Causa in Theoretical Physics by Cosmopolitan University

Null charged *nilmass* shows the same features of already known *neutrino* and *antineutrino*.
This theory is "gauge invariant" because admitted transformations *transmatter↔cisantimatter*, *transmatter↔nilantimatter*, *transantimatter↔cismatter* and *transantimatter↔nilmatter* are absolutely *reversible* exactly as *matter↔antimatter*.
The transformations *transmatter↔cismatter*, *transmatter↔nilmatter*, *transantimatter↔cisantimatter* and *transantimatter↔nilantimatter* are forbidden by *violation of spin*.
We get a coherent explanation of four big enigmas of contemporary physics:

1) the violation of CP symmetry matter-antimatter observed in the Universe;
2) the presence of gravitational inexplicable effects, nowadays ascribed to the so called *dark matter*;
3) the nature of *neutrinos* and *antineutrinos*;
4) the existence of a quantum time arrow.

The last one is measured at cosmic level by matter's percentage increasing compared to antimatter's; therefore it is not linked to macroscopic thermodynamic statistic, even if its direction coincides with entropy-arrow.
A possibility descending directly by the above theory is the *teletransport* of matter and antimatter as photons.
Some practical applications are the following:

1) generators of *nilparticles' and cisparticles' beams*;
2) engines by *gravitational attraction* using nilparticles' beam;
3) *neutralizators of nilmatter and cismatter* into radiant energy.

Hence cismass is an alternative energy source more efficient and less polluting than any else ever found.
The propulsion system must however be revolutionized with motion in the same direction of expelled nilparticles' beam which creates a space-time deformation dragging the aircraft forwards.
Engines by *tachyons' propulsion* using *cisparticles' beams* are subordinated to a *conjectured* conservation of movement quantity also for mixed *transmass-cismass* systems.
In this case the propelling system would be the classic one, *i.e.* aircraft moving in direction opposite to beam's with the same movement quantity of expelled cisparticles.
Cismass would be an unlimited source of energy rather easy to use, because even *a single* cisparticle could push any mass at any velocity, so that we might conclude: *"give me a positron and I will move the Earth"*.

3 DEFINITIONS

3.1 Let Δt_0 be the time-interval at rest, *i.e.* measured when not moving.

3.2 Let Δt be the time-interval measured in movement, *i.e.* at velocity v.

3.3 Let Δx_0 be the space-interval at rest, *i.e.* measured when not moving.

3.4 Let Δx be the space-interval measured in movement's direction, *i.e.* at velocity v.

3.5 Let m_0 be the mass at rest, *i.e.* measured when not moving.

3.6 Let m be the total mass, *i.e.* measured at velocity v.

3.7 Let c be the speed of light in vacuo.

3.8 Denote $\beta=v/c$ the ratio between particle's velocity and speed of light.

3.9 Denote $\alpha=m/m_0$ the ratio between particle's moving and rest mass.

3.10 Let $\alpha=1$ be the *rest* condition: $m=m_0$.

3.11 Let $|\alpha|>1$ be the *transmass* condition: $|m|>|m_0|$.

3.12 Let $0<|\alpha|<1$ be the *cismass* condition: $|m|<|m_0|$.

3.13 Let $\alpha=0$ be the *nilmass* condition: $m=0,\ m_0\neq 0$.

3.14 Denote *matter* the state of *transmass* with total *positive* mass: $m>m_0>0$.

3.15 Denote a the generic *transparticle*, with charge C and spin $\pm½$.

3.16 Denote *antimatter* the state of *transmass* with total *negative* mass: $m<-m_0<0$.

3.17 Denote $\bar{a}$ the generic *transantiparticle*, with charge $-C$ and spin $\pm½$.

3.18 Denote *cismatter* the state of *cismass* with total *positive* mass: $0<m<m_0$.

3.19 Denote $\ddot{a}$ the generic *cisparticle*, with charge C and spin $\pm½$.

3.20 Denote *cisantimatter* the state of *cismass* with total *negative* mass: $-m_0<m<0$.

3.21 Denote $\tilde{a}$ the generic *cisantiparticle*, with charge $-C$ and spin $\pm½$.

3.22 Denote *nilmatter* the state of *nilmass* with *positive* rest mass: $m=0^+,\ m_0>0$.

3.23 Denote $\breve{a}$ the generic *nilparticle*, with charge C and spin $\pm½$.

3.24 Denote *nilantimatter* the state of *nilmass* with *negative* rest mass: $m=0^-,\ m_0<0$.

3.25 Denote $\hat{a}$ the generic *nilantiparticle*, with charge $-C$ and spin $\pm½$.

3.26 Let *tachyon* be any particle faster than light: $v>c$.

3.27 Let *STL* be the acronym for *Slower Than Light:* $v<c$.

3.28 Let *FTL* be the acronym for *Faster Than Light:* $v>c$.

3.29 Let *SP* be the acronym for *Super Partes* compared to *STL* and *FTL*.

4 PROPOSITIONS

4.1 $|\alpha|>1 \Rightarrow \alpha=\gamma$.
Explanation. Comparing relativistic mass equation $m=\gamma m_0$ to Def. 3.9 $m=\alpha m_0$ we have $\gamma=\alpha$.

4.2 $|\alpha|>1 \Rightarrow \beta^2=1-(1/\alpha)^2$.
Expl. According to Proposition 4.1, by isolating β.

4.3 $|\alpha|>1 \Rightarrow v=c*[1-(m_0/m)\text{^}2]\text{^}½$.
Expl. By Definitions 3.8 and 3.9 and according to Proposition 4.2.

4.4 $|\alpha|>1 \Rightarrow \alpha=\Delta t/\Delta t_0=\Delta x_0/\Delta x$.
Expl. By Prop. 4.1 and according to Lorentz equations: $\gamma=\Delta t/\Delta t_0=\Delta x_0/\Delta x=m/m_0$.

4.5 ***The possible particles energy states are: rest, transmass, cismass, nilmass.***
Expl. Definitions 3.10, 3.11, 3.12 e 3.13 regard all possible values of α.

4.6 ***Transmass shows a space-contraction and a time-stretching compared to rest condition.***
Expl. By Defs. 3.9 and 3.11 and according to Prop. 4.4: $\Delta x<\Delta x_0$, $\Delta t>\Delta t_0$.

5 HYPOTHESES

5.1 $|\alpha|<1 \Rightarrow \beta^2=1/(1-\alpha^2)$.

Explanation. Extension of Lorentz equations justified, in general, by:

1) recovery of velocities' range between $v=c$ and $v=\infty$ excluded by Relativity.

2) heuristic value of consequent theory, providing an organic explanation of some cosmic enigmas.

and specifically by:

3) algebraic symmetry, after substituting β by α in Prop. 4.1: $\beta^2=1-(1/\alpha)^2$.

4) geometric symmetry respect to bisecting line $\beta=\alpha$ in diagram $\beta=\beta(\alpha)$.

5.2 $|\alpha|<1 \Rightarrow v=c/[1-(m/m_0)\text{^}2]\text{^}½$.

Expl. By Definitions 3.8 and 3.9 and according to Hypothesis 5.1.

5.3 $|\alpha|<1 \Rightarrow \alpha=\Delta t/\Delta t_0=\Delta x_0/\Delta x$.

Expl. Extension of Lorentz equations, no more depending on relativistic factor γ, *i.e.* to velocity: $\gamma=\Delta t/\Delta t_0=\Delta x_0/\Delta x=m/m_0$;
but in function of α, *i.e.* linked directly to particles' mass:
$\Delta t/\Delta t_0=\Delta x_0/\Delta x=m/m_0=\alpha$.

5.4 ***Cismass shows a space-stretching and a time-contraction compared to rest condition.***

Expl. By Definition 3.12 and according to Hypothesis 5.3: $\Delta x>\Delta x_0$, $\Delta t<\Delta t_0$.

5.5 ***The conservation of spin, charge, and energy-momentum is valid to SP observers as well.***

Expl. Extension of conservation principles valid to STL observers.

5.6 ***The quantum energy $E=h\nu$ is valid to SP observers as well.***

Expl. Extension of quantum energy brought by photons valid to STL observers.

5.7 ***Cisparticles have the same spin and charge of the corresponding particles.***

Expl. Extension of conservation principles valid to STL observers.

5.8 ***Nilparticles have the same spin and charge of the corresponding particles.***

Expl. Extension of conservation principles valid to STL observers.

5.9 ***Cisantiparticles have the same spin and charge of the corresponding antiparticles.***

Expl. Extension of conservation principles valid to STL observers.

5.10 ***Nilantiparticles have the same spin and charge of the corresponding antiparticles.***

Expl. Extension of conservation principles valid to STL observers.

5.11 ***Cisparticles and cisantiparticles are tachyons.***

Expl. Cismass is faster than light.

5.12 ***Nilparticles and nilantiparticles are noticeable to any STL, FTL and SP observer.***

Expl. Nilmass goes at speed of light.

5.13 ***Transformation transmatter↔cisantimatter is gauge-invariant.***

Expl. Extension of gauge-invariant transformation: *matter↔antimatter*.

5.14 ***Transformation transmatter↔nilantimatter is gauge-invariant.***

Expl. Extension of gauge-invariant transformation: *matter↔antimatter*.

5.15 ***Transformation transantimatter↔cismatter is gauge-invariant.***

Expl. Extension of gauge-invariant transformation: *matter↔antimatter*.

5.16 ***Transformation transantimatter↔nilmatter is gauge-invariant.***

Expl. Extension of gauge-invariant transformation: *matter↔antimatter*.

6 THESES

6.1 ***Transformation matter→cismatter is impossible.***
Explanation. This transformation violates spin conservation to SP observers.
SP observed impossible transformation of particle into cisparticle:
a≠γ+ă (Charge conserved: C=0+C; Spin violated: ½≠1+½),
is FTL observed as impossible creation from nothing of cisparticle-photon pair.

6.2 ***Transformation cismatter→matter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP observed impossible transformation of cisparticle into particle:
γ+ă≠a (Charge conserved: 0+C=0; Spin violated: 1+½≠½),
is FTL observed as impossible disappearance to nothingness of cisparticle-photon pair.

6.3 ***Transformation matter→nilmatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and STL observed impossible annihilation of pair particle-nilparticle into photon:
a≠γ+ǎ (Charge conserved: –C=0–C; Spin violated: ½≠1+½),
is FTL observed as impossible creation from nothing of nilparticle-photon pair.

6.4 ***Transformation nilmatter→matter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and STL observed impossible transformation of nilparticle into particle:
γ+ǎ≠a (Charge conserved: 0–C=–C; Spin violated: 1+½≠½),
is FTL observed as impossible disappearance to nothingness of photon-nilparticle pair.

6.5 ***Transformation cismatter→nilmatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and FTL observed impossible transformation of cisparticle into nilparticle:
ă≠γ+ǎ (Charge conserved: –C=0–C; Spin violated: ½≠1+½),
is STL observed as impossible creation from nothing of nilparticle-photon pair.

6.6 ***Transformation nilmatter→cismatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and FTL observed impossible transformation of nilparticle into cisparticle:
γ+ǎ ≠ă (Charge conserved: 0=C–C; Spin violated: 1+½≠½),
is STL observed as impossible disappearance to nothingness of photon-nilparticle pair.

6.7 ***Transformation antimatter→cisantimatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP observed impossible transformation of antiparticle into cisantiparticle:
ā≠γ+ă (Charge conserved: –C=0–C; Spin violated: ½≠1+½),
is FTL observed as impossible creation from nothing of photon-cisantiparticle pair.

6.8 ***Transformation cisantimatter→antimatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP observed impossible transformation of cisantiparticle into antiparticle:
γ+ă≠ā (Charge conserved: 0–C=–C; Spin violated: 1+½≠½),
is FTL observed as impossible disappearance to nothingness of cisantiparticle-photon pair.

6.9 ***Transformation antimatter→nilantimatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and STL observed impossible transformation of antiparticle into nilantiparticle:
ā≠γ+â (Charge conserved: C=0+C; Spin violated: ½≠1+½),
is FTL observed as impossible creation from nothing of nilantiparticle-photon pair.

6.10 ***Transformation nilantimatter→antimatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and STL observed impossible transformation of nilantiparticle into antiparticle:
γ+â≠ã (Charge conserved: 0+C=C; Spin violated: 1+½≠½),
is FTL observed as impossible transformation of photon into nilantiparticle.

6.11 ***Transformation nilantimatter→cisantimatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and FTL observed impossible transformation of nilantiparticle into cisantiparticle:
γ+â≠ã (Charge conserved: 0+C=C; Spin violated: 1+½≠½),
is STL observed as impossible disappearance to nothingness of photon-nilantiparticle pair.

6.12 ***Transformation cisantimatter→nilantimatter is impossible.***
Expl. This transformation violates spin conservation to SP observers.
SP and FTL observed impossible transformation of cisantiparticle into nilantiparticle:
ã+γ≠â (Charge conserved: C–C=0; Spin violated: ½+1≠½),
is STL observed as impossible creation from nothing of nilantiparticle-photon pair.

6.13 ***CP symmetry is violated in favour of: matter, cisantimatter and nilantimatter.***
Expl. SP observed transformations into matter, cisantimatter e nilantimatter are energetically favourite.
In fact in transformation of antiparticle–cisparticle pair into particle–cisantiparticle's: $\bar{a}+\ddot{a}\rightarrow a+\tilde{a}$, the minimum photon γ_{min} necessary to come out of cismass depends on cisparticle's energy, between $-m_0c^2$ and $+m_0c^2$, *i.e.* the energy minimum value sufficient for any transition cismass→transmass is: $E_{min}=2m_0c^2$.
Similarly in transformation of antiparticle–nilparticle pair into particle–nilantiparticle's: $\bar{a}+\breve{a}\rightarrow a+\hat{a}$, the minimum photon γ_{min} necessary to come out of nilmass is: $\pm m_0c^2$, *i.e.* the energy minimum value sufficient for any transition nilmass→transmass is: $E_{min}=m_0c^2$.
On the opposite, in transformation of particle–cisantiparticle pair into antiparticle–cisparticle: $a+\tilde{a}\rightarrow\bar{a}+\ddot{a}$, the minimum photon γ_{min} necessary to become cismass depends on particle's energy, between $\pm m_0c^2$ and $\pm\infty$, *i.e.* there is not an energy minimum value sufficient for any transition transmass→cismass.
Analogously, in transformation of particle–nilantiparticle's pair into antiparticle–nilparticle's: $a+\hat{a}\rightarrow\bar{a}+\breve{a}$, the minimum photon γ_{min} necessary to become nilparticle depends on particle's energy, between $\pm m_0c^2$ and $\pm\infty$, *i.e.* there is not an energy minimum value sufficient for any transition transmass→nilmass.

6.14 ***There is a quantum time-arrow whose direction coincides with entropy-arrow.***
Expl. By Thesis 6.13, the time direction marked by violation of symmetry CP in favour of matter coincides with the macroscopically observed entropy-arrow, although it has totally a different explanation. The matter's percentage increasing (compared to the antimatter's) provides an irreversible cosmic measurement of time.

6.15 ***It's conceptually possible the teletransport of matter as radiant energy.***
Expl. SP and STL observed teletransport of particle: $a+\hat{a}\rightarrow\gamma\rightarrow a+\hat{a}$,
is FTL observed as transformation nilantiparticle↔photon.

6.16 ***It's conceptually possible the teletransport of antimatter as radiant energy.***
Expl. SP and STL observed teletransport of antiparticle: $\bar{a}+\breve{a}\rightarrow\gamma\rightarrow\bar{a}+\breve{a}$,
is FTL observed as transformation nilparticle↔photon.

6.17 ***It's conceptually possible the teletransport of cismatter as radiant energy.***
Expl. SP and STL observed teletransport of cisparticle: $\ddot{a}+\hat{a}\rightarrow\gamma\rightarrow\ddot{a}+\hat{a}$,
is STL observed as transformation nilantiparticle↔photon.

6.18 ***It's conceptually possible the teletransport of cisantimatter as radiant energy.***
Expl. The teletransport of cisantiparticle to observers SP and FTL: $\tilde{a}+\check{a}\rightarrow\gamma\rightarrow\tilde{a}+\check{a}$,
is STL observed as transformation nilparticle↔photon.

6.19 ***There are STL observed apparent violations of charge, spin and mass-energy conservation.***
Expl. SP and FTL observed annihilation of pair cisparticle-cisantiparticle into photon:
ä+ã=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is STL observed as creation from nothing of photon.
SP and FTL observed transformation of photon into cisparticle-cisantiparticle pair:
γ=ã+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is STL observed as disappearance to nothingness of photon.
SP observed annihilation of cisparticle-antiparticle pair into photon:
ā +ä=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is STL observed as transformation of antiparticle into photon.
SP observed transformation of photon into cisantiparticle-particle pair:
γ=ã+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is STL observed as transformation of photon into particle.
SP observed annihilation of particle-cisantiparticle pair into photon:
ã+a=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is STL observed as transformation of particle into photon.
SP observed transformation of photon into antiparticle-cisparticle pair:
γ=ā+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is STL observed as transformation of photon into antiparticle.
SP and FTL observed annihilation of cisparticle-nilantiparticle pair into photon:
ä+â=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is STL observed as transformation of nilantiparticle into photon.
SP and FTL observed transformation of photon into cisantiparticle-nilparticle pair:
γ=ã+ă (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is STL observed as transformation of photon into nilparticle.
SP and FTL observed transformation of photon into cisparticle-nilantiparticle pair:
γ=ä+â (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is STL observed as transformation of photon into nilantiparticle.
SP and FTL observed annihilation of cisantiparticle-nilparticle pair into photon:
ã+ă=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is STL observed as transformation of nilparticle into photon.

6.20 ***There are FTL observed apparent violations of charge, spin and mass-energy conservation.***
Expl. SP and STL observed annihilation of particle-antiparticle pair into photon:
a+ā=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is FTL observed as creation from nothing of photon.
SP and STL observed transformation of photon into particle-antiparticle pair:
γ=ā+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is FTL observed as disappearance to nothingness of photon.
SP observed annihilation of cisparticle-antiparticle pair into photon:
ā +ä=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is FTL observed as transformation of cisparticle into photon.
SP observed transformation of photon into cisantiparticle-particle pair:
γ=ã+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is FTL observed as transformation of photon into cisantiparticle.
SP observed annihilation of particle-cisantiparticle pair into photon:
ã+a=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is FTL observed as transformation of cisantiparticle into photon.
SP observed transformation of photon into antiparticle-cisparticle pair:
γ=ā+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is FTL observed as transformation of photon into cisparticle.

SP and STL observed annihilation of particle-nilantiparticle pair into photon:
a+â=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is FTL observed as transformation of nilantiparticle into photon.
SP and STL observed transformation of photon into antiparticle-nilparticle pair:
γ=ā+ă (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is FTL observed as transformation of photon into nilparticle.
SP and STL observed transformation of photon into particle-nilantiparticle pair:
γ=a+â (Charge conserved: 0=C–C; Spin conserved: 1=½+½),
is FTL observed as transformation of photon into nilantiparticle.
SP and STL observed annihilation of antiparticle-nilparticle pair into photon:
ā+ă=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1),
is FTL observed as transformation of nilparticle into photon.

6.21 ***Nilmass has the same features of the so called dark matter.***
Expl. It has gravitational and electromagnetic effects inexplicable by nowadays knowledge.

6.22 ***Neutral nilparticles have the same features of neutrinos.***
Expl. Their null charge and mass, Fermion's spin and light's velocity are identical to neutrinos'.

6.23 ***Neutral nilantiparticles have the same features of antineutrinos.***
Expl. Their null charge, null mass, Fermion's spin and light's velocity are identical to antineutrinos'.

7 CONJECTURES

7.1 ***In isolated systems the transformation transmass↔cismass conserves the movement quantity.***
Explanation. Extension of the conservation principle valid to STL observers.

7.2 ***Cismass is an energy source potentially unlimited.***
Expl. Consequence of conjecture 7.1. The more its mass grows close, however lower, to the particle at rest, the more the cisparticle increases its velocity, until infinite. Hence by expelling a cisparticle in an isolated system, by the movement quantity conservation the product between its mass, tiny but not zero, and its velocity, adjustable at pleasure in the range between c and ∞, we get a counter-propulsion for the left system. This propulsion is potentially *unlimited*, *i.e.* a single expelled cisparticle could move any mass at any velocity.

8 PRACTICAL APPLICATIONS

8.1 *Generator of nilparticles' beams.*

Explanation. Denote: *h=Plank's constant*, *n=antiparticles' number*, *<m>=average mass*, *ν=laser ray's frequency*. *Nilmatter's* generation requires the antiparticles' beam to collide with a laser ray whose frequency is:

$\nu_{nilmatter}=n_{antiparticles}*(m_{nilparticle}-<m_{antiparticle}>)*c^2/h=n_{antiparticles}*|<m_{antiparticle}>|*c^2/h$.

8.2 *Generator of cisparticles' beams.*

Expl. Denote: *h=Plank's constant*, *n=antiparticles' number*, *<m>=average mass*, *ν=laser ray's frequency*. *Cismatter's* generation requires the antiparticles' beam to be collided with a laser ray whose frequency is:

$\nu_{cismatter}=n_{antiparticles}*(<m_{cisparticle}>-<m_{antiparticle}>)*c^2/h$.

8.3 *Aircraft by gravitational attraction.*

Expl. It uses generators of *nilmatter*. By concentrating some nilparticles' beams in the same place a temporary bubble of nilmatter forms, attracting the aircraft towards it.

Hence the aircraft runs after a space-time's deformation created by itself, exactly as due to a huge close mass whose extent is adjusted at pleasure according to beams' consistencies. By orientating beams the velocity's direction is governed as well.

8.4 *Aircraft by tachyonic propulsion.*

Expl. It uses generators of *cismatter*. By assuming Conjectures 7.1 e 7.2, *i.e.* the conservation of movement quantity for a SP oberver, the speed of aircraft *v* is linked to the aircraft's mass *M*, the cismass *m* of expelled beam, the beam's speed *w*, by equation:

v=mw/(M–m).

A single expelled particle's velocity *w* is linked to its mass by equation:

w=c/[1–(m/m₀)^2]^½;

therefore, considering for beam's cisparticles an average mass *<m>* and velocity *<w>*, for the aircraft we have:

*<v>=<m>*c/{(M–<m>)*[1–(<m>/m₀)^2]^½}*.

Since *m<<M*, cismass must have a velocity *w>>v*, *i.e.* the cisparticles'mass should get close to the particles' m_0 at rest.

It requires a laser ray of frequence:

$\nu\cong n_{antiparticles}*(m_0-<m_{antiparticle}>)*c^2/h$.

For example a *positron*, to whom has been given enough energy to increase its mass almost at m_e, becomes a very fast cispositron whose movement quantity is potentially unlimited and once expelled from an aircraft, could push it backwards. In this case the laser ray frequency is:

$\nu\cong(m_e-m_{positron})*c^2/h$.

The technical difficulty lays in calibrating the energy of colliding photon at right value, neither becoming a slow cisparticle, whose movement quantity is useless in the balance of our isolated system nor trespassing the transmatter's border becoming an ordinary electron.

8.5 *Neutralizator of nilmatter.*

Expl. It uses generators of *antimatter*. An antiparticles' beam collides with a nilparticles's one according to the conversion into photons: $\bar{a}+\breve{a}\rightarrow\gamma$.

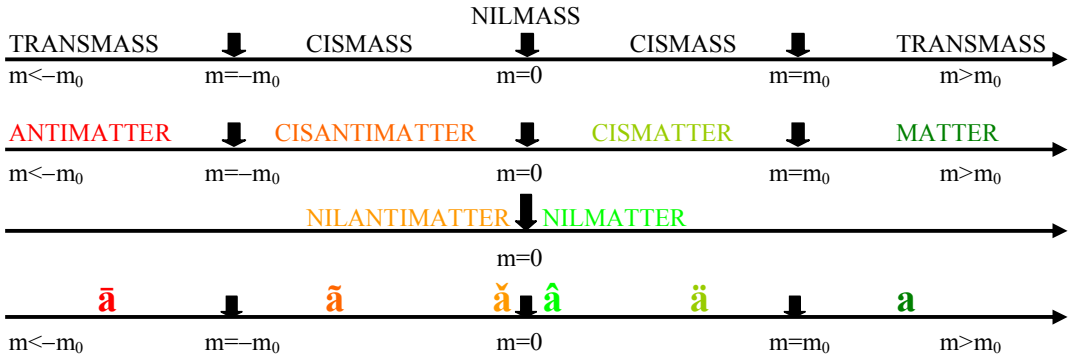
8.6 *Neutralizator of cismatter.*

Expl. It uses generators of *antimatter*. An antiparticles' beam collides with a cisparticles's one according to the conversion into photons: $\bar{a}+\ddot{a}\rightarrow\gamma$.

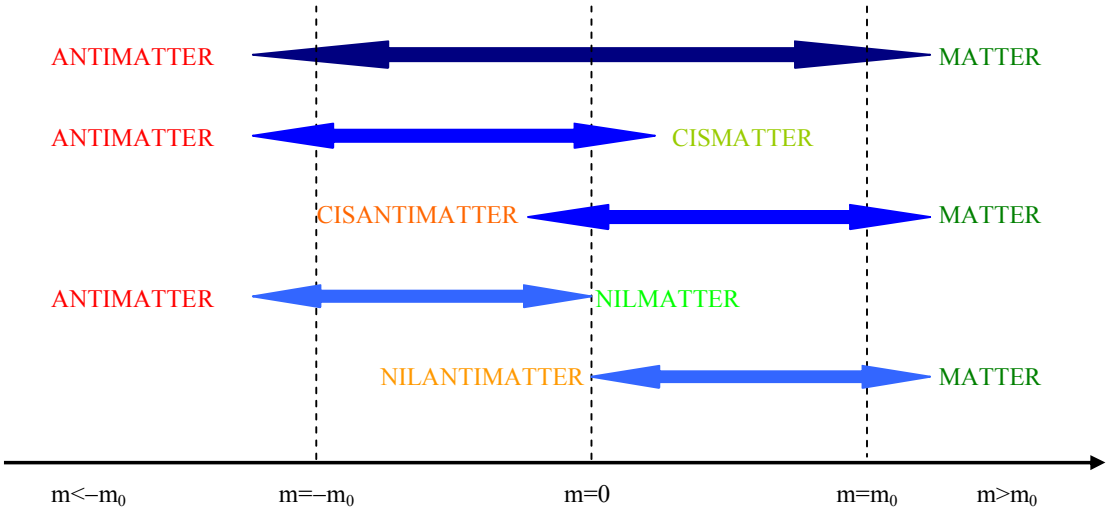
9 DIAGRAMS

9.1 *Classification of particles based upon energy levels.*

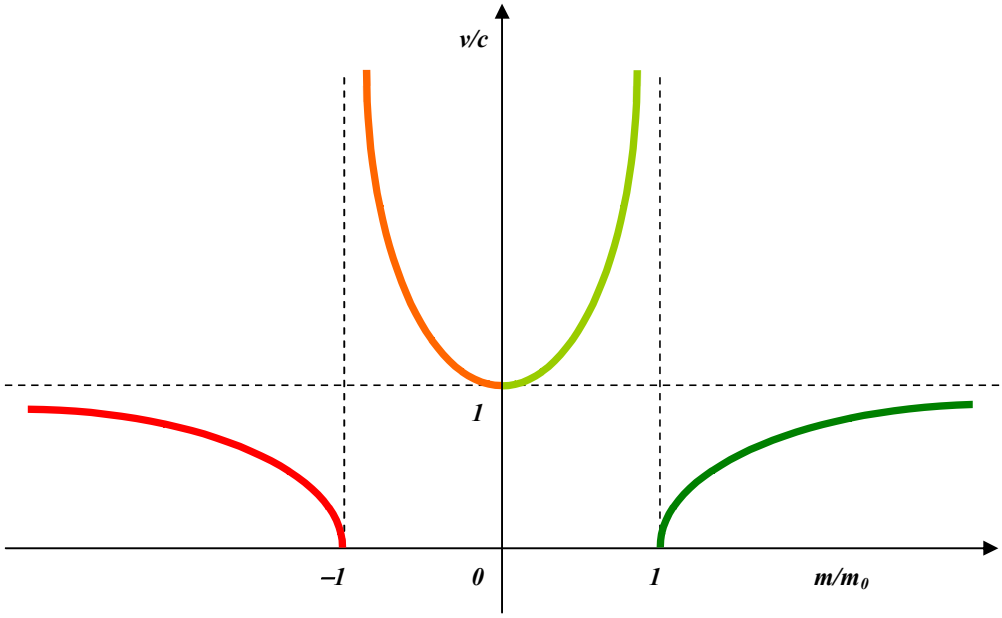
Description	*Particle*	*Mass at rest*	*Moving mass*	*Length*	*Time*	*Velocity*	*Spin*
RADIANT ENERGY	Photon	$m_0=0$	$m=E/c^2\neq0$	$\Delta x=0$	$\Delta t=\infty$	v=c	1
TRANSMASS	Matter	$m_0>0$	$m>m_0$	$0<\Delta x<\Delta x_0$	$\Delta t_0<\Delta t$	v<c	±½
	Antimatter	$m_0<0$	$m<m_0$	$-\Delta x_0<\Delta x<0$	$\Delta t<-\Delta t_0$	v<c	±½
CISMASS	Cismatter	$m_0>0$	$0<m<m_0$	$\Delta x_0<\Delta x$	$0<\Delta t<\Delta t_0$	v>c	±½
	Cisantimatter	$m_0<0$	$m_0<m<0$	$\Delta x<-\Delta x_0$	$-\Delta t_0<\Delta t<0$	v>c	±½
	Nilmatter	$m_0>0$	m=0	$\Delta x=\infty$	$\Delta t=0$	v=c	±½
	Nilantimatter	$m_0<0$	m=0	$\Delta x=\infty$	$\Delta t=0$	v=c	±½



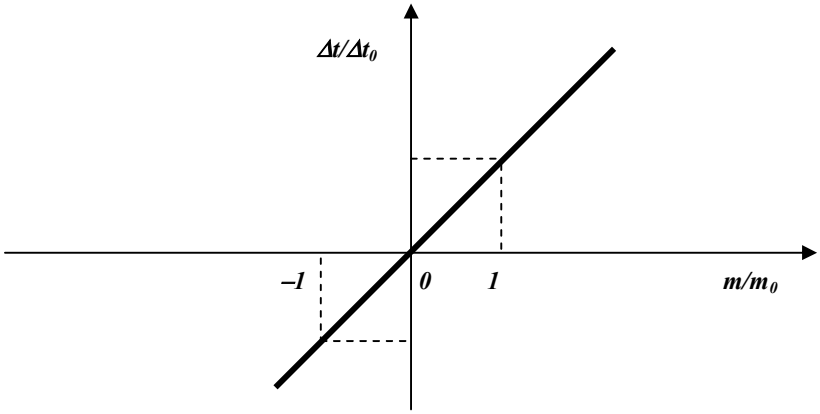
9.2 *Transitions among energy levels where spin and charge are conserved.*



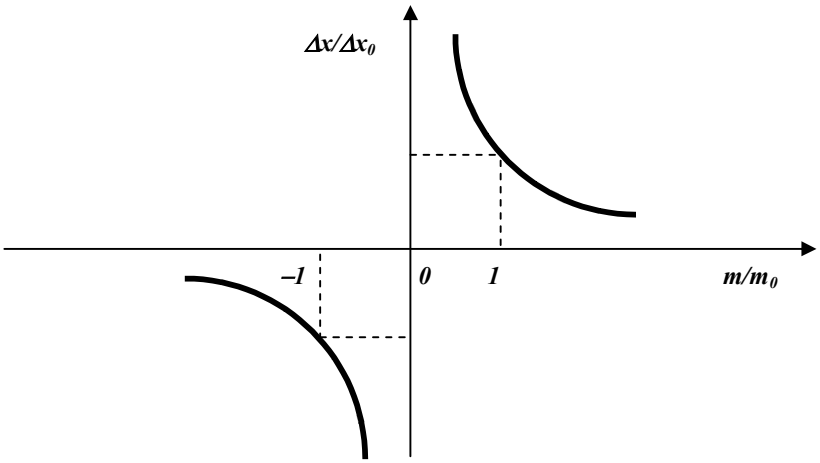
9.3 ***Velocity of particle in function of its mass $\beta=\beta(\alpha)$.***



9.4 ***Time-stretching of particle in function of its mass $\Delta t=\alpha\Delta t_0$.***



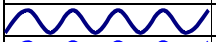
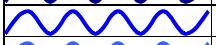
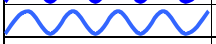
9.5 ***Length-contraction of particle in function of its mass $\Delta x=\Delta x_0/\alpha$.***



9.6 *Electromagnetic interactions*

9.6.1 Left-to-right in the diagrams represents time, a process begins on the left and ends on the right.

9.6.2 Every line in the diagram represents a particle; the seven types of particles are:

Image	*Description*	*Particle represented*	*Energy*	*Spin*	*Charge*
	Dark blue wavy line	Photon: γ	$0<E/c^2<\infty$	1	0
	Blue wavy line	Photon: γ	$0<E/c^2<2m_0$	1	0
	Light blue wavy line	Photon: γ	$0<E/c^2<m_0$	1	0
	Green straight line, arrow to the right	Particle: a	$m>m_0>0$	½	C
	Light green straight line, arrow to the right	Cisparticle: ä	$0<m<m_0$	½	C
	Lemon green straight line, arrow down	Nilparticle: ǎ	$m=0^+$	½	C
	Red straight line, arrow to the left	Antiparticle: ā	$m<-m_0<0$	½	–C
	Orange straight line, arrow to the left	Cisantiparticle: ã	$-m_0<m<0$	½	–C
	Light orange straight line, arrow down	Nilantiparticle: â	$m=0^-$	½	–C

9.6.3 Up and down (vertical) displacement in a diagram indicates particle motion, but no attempt is made to show direction or speed, except schematically.

9.6.4 Any vertex (point where at least three lines meet) represents an electromagnetic interaction (absorption/emission of a photon).

9.6.5 Any interaction is observed by three different reference-systems: *super partes SP*, ordinary *slower than light STL*, *faster than light FTL*.

9.6.6 ***Captions.***

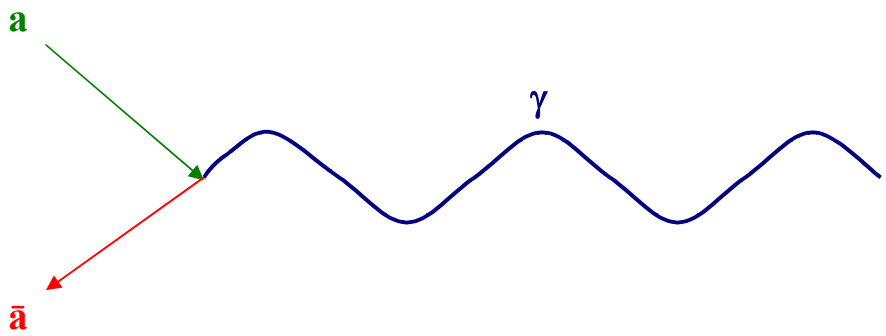
9.6.7 Transformation: a+ā=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.7.1 SP and STL observed annihilation of particle-antiparticle pair into photon.
9.6.7.2 FTL observed creation from nothing of photon.
9.6.8 Transformation: γ=ā+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.8.1 SP and STL observed transformation of photon into particle-antiparticle pair.
9.6.8.2 FTL observed disappearance to nothingness of photon.
9.6.9 Transformation: ä+ã=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.9.1 SP and FTL observed annihilation of cisparticle-cisantiparticle pair into photon.
9.6.9.2 STL observed creation from nothing of photon.
9.6.10 Transformation: γ=ã+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.10.1 SP and FTL observed transformation of photon into cisparticle-cisantiparticle pair.
9.6.10.2 STL observed disappearance to nothingness of photon.
9.6.11 Transformation: ā+ä=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.11.1 SP observed annihilation of cisparticle-antiparticle pair into photon.
9.6.11.2 STL observed transformation of antiparticle into photon.
9.6.11.3 FTL observed transformation of cisparticle into photon.
9.6.12 Transformation: γ=ã+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.12.1 SP observed transformation of photon into cisantiparticle-particle pair.
9.6.12.2 STL observed transformation of photon into particle.
9.6.12.3 FTL observed transformation of photon into cisantiparticle.
9.6.13 Transformation: ã+a=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.13.1 SP observed annihilation of particle-cisantiparticle pair into photon.
9.6.13.2 STL observed transformation of particle into photon.
9.6.13.3 FTL observed transformation of cisantiparticle into photon.
9.6.14 Transformation: γ=ā+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.14.1 SP observed transformation of photon into antiparticle-cisparticle pair.
9.6.14.2 STL observed transformation of photon into antiparticle.
9.6.14.3 FTL observed transformation of photon into cisparticle.
9.6.15 Impossible transformation: a≠γ+ä (Charge conserved: C=0+C; Spin violated: ½≠1+½).
9.6.15.1 SP observed impossible transformation of particle into cisparticle.
9.6.15.2 FTL observed impossible creation from nothing of cisparticle-photon pair.

9.6.16 Impossible transformation: γ+ã≠ā (Charge conserved: 0–C=–C; Spin violated: 1+½≠½).
9.6.16.1 SP observed impossible transformation of cisantiparticle into antiparticle.
9.6.16.2 FTL observed impossible disappearance to nothingness of cisantiparticle-photon pair.
9.6.17 Impossible transformation: γ+ä≠a (Charge conserved: 0+C=0; Spin violated: 1+½≠½).
9.6.17.1 SP observed impossible transformation of cisparticle into particle.
9.6.17.2 FTL observed impossible disappearance to nothingness of cisparticle-photon pair.
9.6.18 Transformation: ā≠γ+ã (Charge conserved: –C=0–C; Spin violated: ½≠1+½).
9.6.18.1 SP observed impossible transformation of antiparticle into cisantiparticle.
9.6.18.2 FTL observed impossible creation from nothing of photon-cisantiparticle pair.
9.6.19 Transformation: a+â=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.19.1 SP and STL observed annihilation of particle-nilantiparticle pair into photon.
9.6.19.2 FTL observed transformation of nilantiparticle into photon.
9.6.20 Transformation: γ=ā+ǎ (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.20.1 SP and STL observed transformation of photon into antiparticle-nilparticle pair.
9.6.20.2 FTL observed transformation of photon into nilparticle.
9.6.21 Transformation: γ=a+â (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.21.1 SP and STL observed transformation of photon into particle-nilantiparticle pair.
9.6.21.2 FTL observed transformation of photon into nilantiparticle.
9.6.22 Transformation: ā+ǎ=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.22.1 SP and STL observed annihilation of antiparticle-nilparticle pair into photon.
9.6.22.2 FTL observed transformation of nilparticle into photon.
9.6.23 Transformation: ä+â=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.23.1 SP and FTL observed annihilation of cisparticle-nilantiparticle pair into photon.
9.6.23.2 STL observed transformation of nilantiparticle into photon.
9.6.24 Transformation: γ=ã+ǎ (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.24.1 SP and FTL observed transformation of photon into cisantiparticle-nilparticle pair.
9.6.24.2 STL observed transformation of photon into nilparticle.
9.6.25 Transformation: γ=ä+â (Charge conserved: 0=C–C; Spin conserved: 1=½+½).
9.6.25.1 SP and FTL observed transformation of photon into cisparticle-nilantiparticle pair.
9.6.25.2 STL observed transformation of photon into nilantiparticle.
9.6.26 Transformation: ã+ǎ=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).
9.6.26.1 SP and FTL observed annihilation of cisantiparticle-nilparticle pair into photon.
9.6.26.2 STL observed transformation of nilparticle into photon.
9.6.27 Impossible transformation: a≠γ+ǎ (Charge conserved: –C=0–C; Spin violated: ½≠1+½).
9.6.27.1 SP and STL observed impossible annihilation of particle-nilparticle pair into photon.
9.6.27.2 FTL observed impossible creation from nothing of nilparticle-photon pair.
9.6.28 Impossible transformation: γ+â=ā (Charge conserved: 0+C=C; Spin violated: 1+½≠½).
9.6.28.1 SP and STL observed impossible transformation of nilantiparticle into antiparticle.
9.6.28.2 FTL observed impossible transformation of photon into nilantiparticle.
9.6.29 Impossible transformation: γ+ǎ≠a (Charge conserved: 0–C=–C; Spin violated: 1+½≠½).
9.6.29.1 SP and STL observed impossible transformation of nilparticle into particle.
9.6.29.2 FTL observed impossible disappearance to nothingness of photon-nilparticle pair.
9.6.30 Impossible transformation: ā≠γ+â (Charge conserved: C=0+C; Spin violated: ½≠1+½).
9.6.30.1 SP and STL observed impossible transformation of antiparticle into nilantiparticle.
9.6.30.2 FTL observed impossible creation from nothing of nilantiparticle-photon pair.
9.6.31 Impossible transformation: ä≠γ+ǎ (Charge conserved: –C=0–C; Spin violated: ½≠1+½).
9.6.31.1 SP and FTL observed impossible transformation of cisparticle into nilparticle.
9.6.31.2 STL observed impossible creation from nothing of nilparticle-photon pair.
9.6.32 Impossible transformation: γ+â≠ã (Charge conserved: 0+C=C; Spin violated: 1+½≠½).
9.6.32.1 SP and FTL observed impossible transformation of nilantiparticle into cisantiparticle.
9.6.32.2 STL observed impossible disappearance to nothingness of photon-nilantiparticle pair.
9.6.33 Impossible transformation: γ+ǎ≠ä (Charge conserved: 0=C–C; Spin violated: 1+½≠½).
9.6.33.1 SP and FTL observed impossible transformation of nilparticle into cisparticle.
9.6.33.2 STL observed impossible disappearance to nothingness of photon-nilparticle pair.

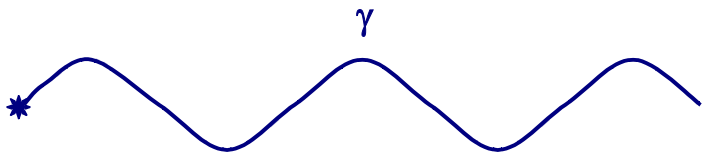
9.6.34 Impossible transformation: ã≠â+γ (Charge conserved: C–C=0; Spin violated: ½≠½+1).
9.6.34.1 SP and FTL observed impossible transformation of cisantiparticle into nilantiparticle.
9.6.34.2 STL observed impossible creation from nothing of nilantiparticle-photon pair.
9.6.35 SP and STL observed teletransport of particle.
9.6.35.1 FTL observed transformation nilantiparticle↔photon.
9.6.36 SP and STL observed teletransport of antiparticle.
9.6.36.1 FTL observed transformation nilparticle↔photon.
9.6.37 SP and STL observed matter-nilantimatter lattice.
9.6.37.1 FTL observed matter-nilantimatter lattice.
9.6.38 SP and STL observed antimatter-nilmatter lattice.
9.6.38.1 FTL observed antimatter-nilmatter lattice.
9.6.39 SP and FTL observed teletransport of cisparticle.
9.6.39.1 STL observed transformation nilantiparticle↔photon.
9.6.40 SP and FTL observed teletransport of cisantiparticle.
9.6.40.1 STL observed transformation nilparticle↔photon.
9.6.41 SP and FTL observed cismatter-nilantimatter lattice.
9.6.41.1 STL observed cismatter-nilantimatter lattice.
9.6.42 SP and FTL observed cisantimatter-nilmatter lattice.
9.6.42.1 STL observed cisantimatter-nilmatter lattice.
9.6.43 SP and STL observed matter-antimatter lattice.
9.6.43.1 FTL observed matter-antimatter lattice.
9.6.44 SP and FTL observed cismatter-cisantimatter lattice.
9.6.44.1 STL observed cismatter-cisantimatter lattice.
9.6.45 SP observed external matter-antimatter mixed lattice.
9.6.45.1 STL observed external matter-antimatter mixed lattice.
9.6.45.2 FTL observed external matter-antimatter mixed lattice.
9.6.46 SP observed internal matter-antimatter mixed lattice.
9.6.46.1 STL observed internal matter-antimatter mixed lattice.
9.6.46.2 FTL observed internal matter-antimatter mixed lattice.
9.6.47 SP observed transformation of particle-cisantiparticle pair into antiparticle-cisparticle's.
9.6.47.1 γ_{min} necessary to enter cismass depends on particle's energy, between $\pm m_0c^2$ and $\pm\infty$.
9.6.47.2 There is not a minimum energy sufficient for any transition transmass→cismass.
9.6.48 SP observed transformation of antiparticle-cisparticle pair into particle-cisantiparticle's.
9.6.48.1 γ_{min} to leave cismass depends on cisparticle's energy, between $-m_0c^2$ and $+m_0c^2$.
9.6.48.2 Minimum energy sufficient for any transition cismass→transmass: $E_{min}=2m_0c^2$.
9.6.49 SP observed energetically favourite matter and cisantimatter.
9.6.49.1 STL observed violation of CP symmetry in favour of matter.
9.6.49.2 FTL observed violation of CP symmetry in favour of cisantimatter.
9.6.50 SP observed transformation of particle-nilantiparticle pair into antiparticle-nilparticle's.
9.6.50.1 γ_{min} necessary to become nilmass depends on particle's energy, between $\pm m_0c^2$ and $\pm\infty$.
9.6.50.2 There is not a minimum energy sufficient for any transition transmass→nilmass.
9.6.51 SP observed transformation of antiparticle-nilparticle pair into particle-nilantiparticle's.
9.6.51.1 γ_{min} necessary to come out of nilmass: $\pm m_0c^2$.
9.6.51.2 Minimum energy sufficient for any transition nilmass→transmass: $E_{min}=m_0c^2$.
9.6.52 SP observed energetically favourite matter and nilantimatter.
9.6.52.1 STL observed violation of CP symmetry in favour of matter.
9.6.52.2 FTL observed violation of CP symmetry in favour of nilantimatter.

9.6.7 ***Transformation: a+ā=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

9.6.7.1 ***SP and STL observed annihilation of particle-antiparticle pair into photon.***

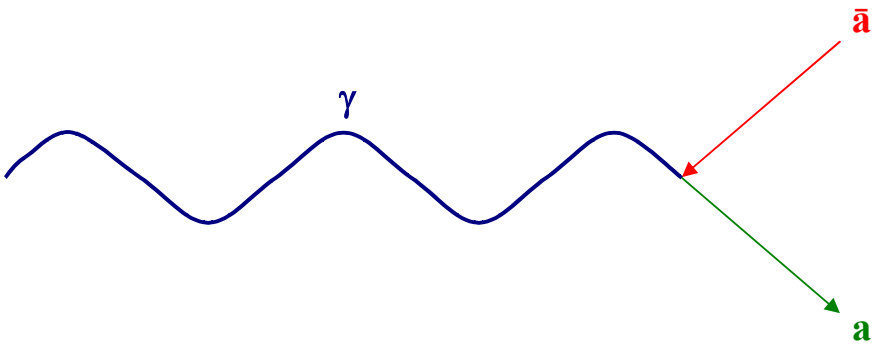


9.6.7.2 ***FTL observed creation from nothing of photon.***

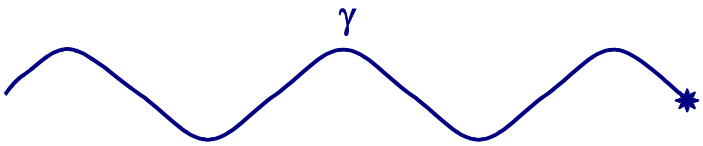


9.6.8 ***Transformation: γ=ā+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

9.6.8.1 ***SP and STL observed transformation of photon into particle-antiparticle pair.***

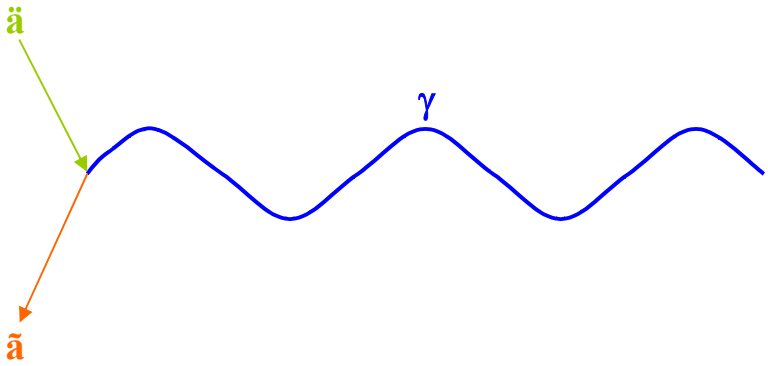


9.6.8.2 ***FTL observed disappearance to nothingness of photon.***

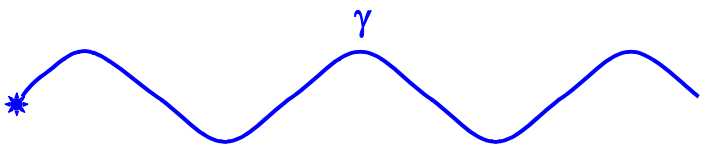


9.6.9 ***Transformation: ä+ã=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

9.6.9.1 ***SP and FTL observed annihilation of cisparticle-cisantiparticle pair into photon.***

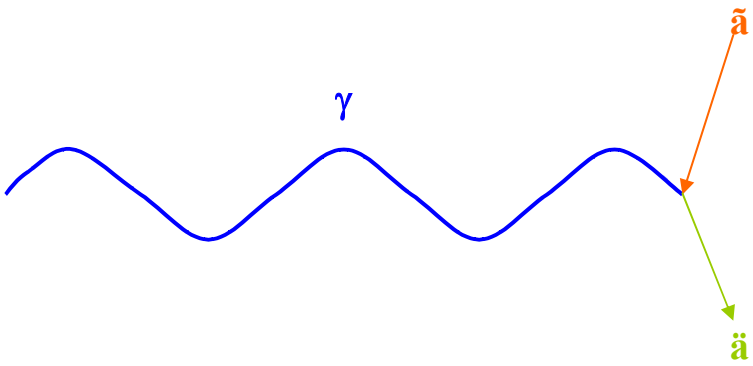


9.6.9.2 ***STL observed creation from nothing of photon.***

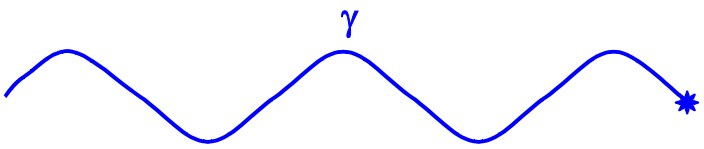


9.6.10 ***Transformation: γ=ã+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

9.6.10.1 ***SP and FTL observed transformation of photon into cisparticle-cisantiparticle pair.***

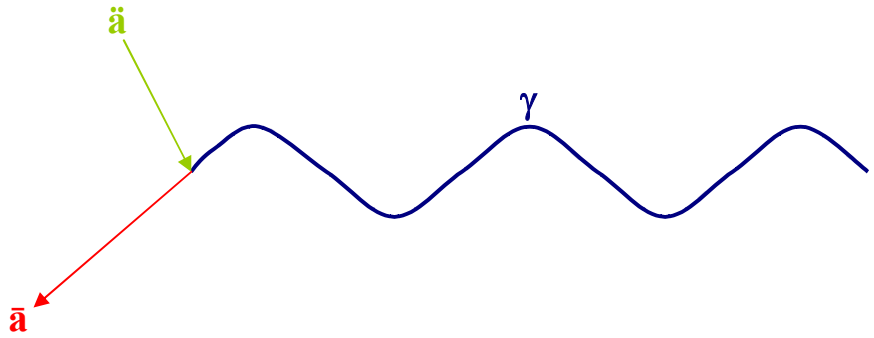


9.6.10.2 ***STL observed disappearance to nothingness of photon.***

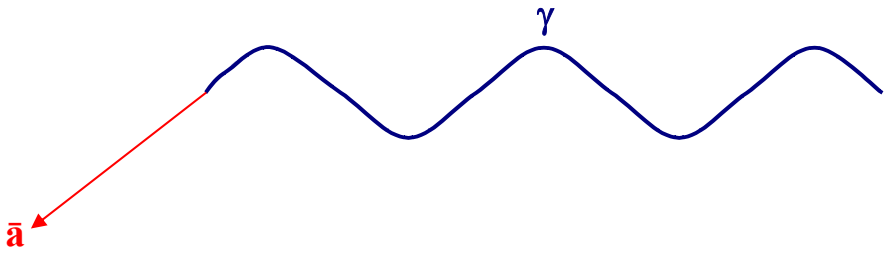


9.6.11 ***Transformation: ā+ä=γ (Charge conserved: C−C=0; Spin conserved: ½+½=1).***

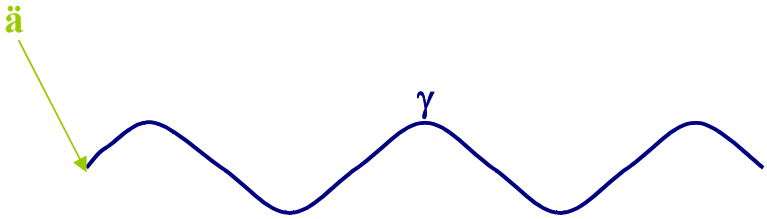
9.6.11.1 ***SP observed annihilation of cisparticle-antiparticle pair into photon.***



9.6.11.2 ***STL observed transformation of antiparticle into photon.***

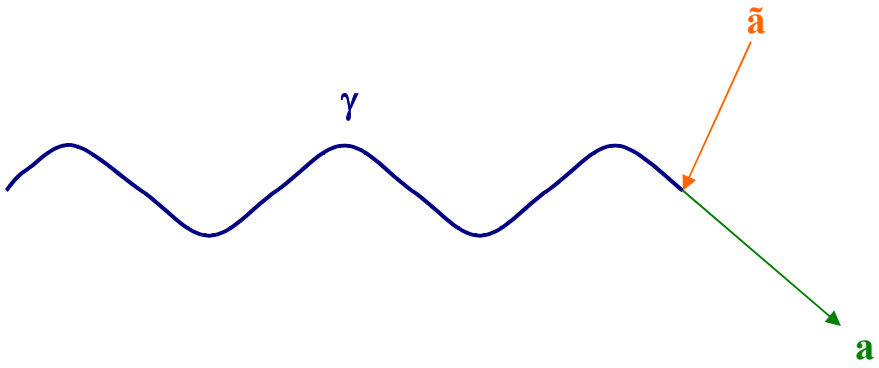


9.6.11.3 ***FTL observed transformation of cisparticle into photon.***

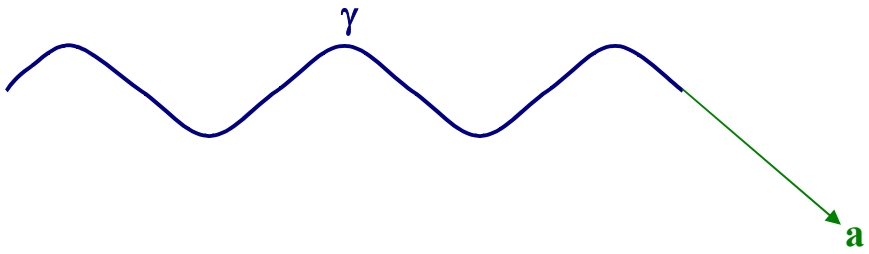


9.6.12 ***Transformation: γ=ã+a (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

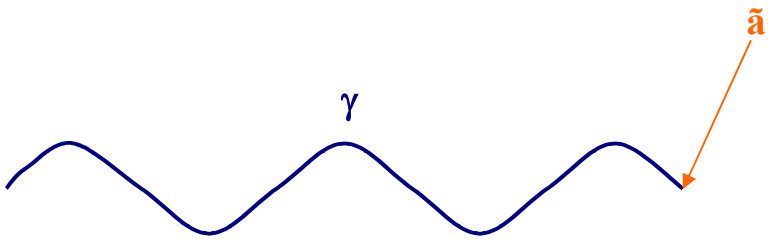
9.6.12.1 ***SP observed transformation of photon into cisantiparticle-particle pair.***



9.6.12.2 ***STL observed transformation of photon into particle.***

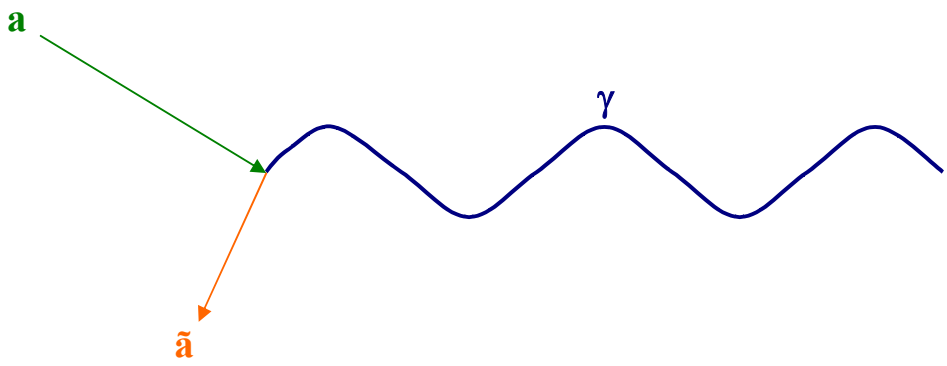


9.6.12.3 ***FTL observed transformation of photon into cisantiparticle.***

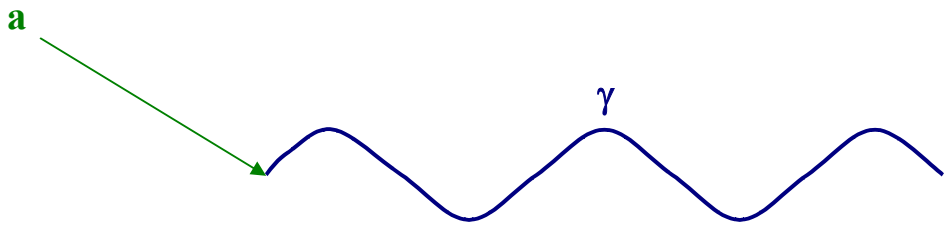


9.6.13 ***Transformation: ã+a=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

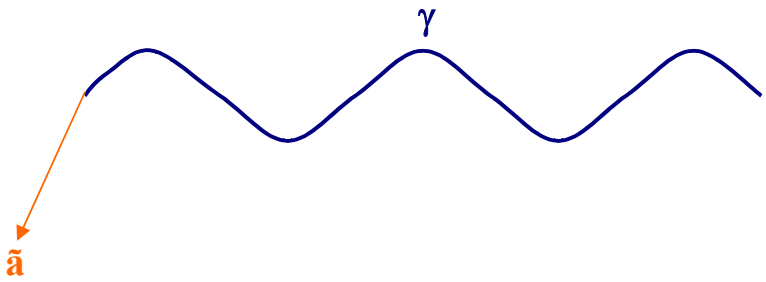
9.6.13.1 ***SP observed annihilation of particle-cisantiparticle pair into photon.***



9.6.13.2 ***STL observed transformation of particle into photon.***

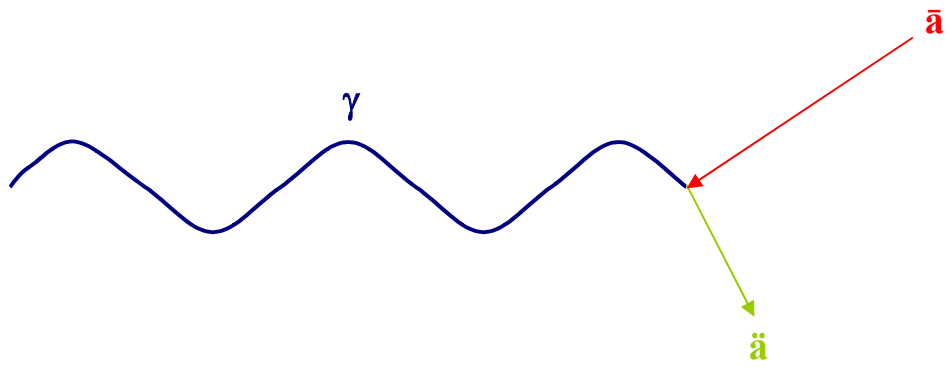


9.6.13.3 ***FTL observed transformation of cisantiparticle into photon.***

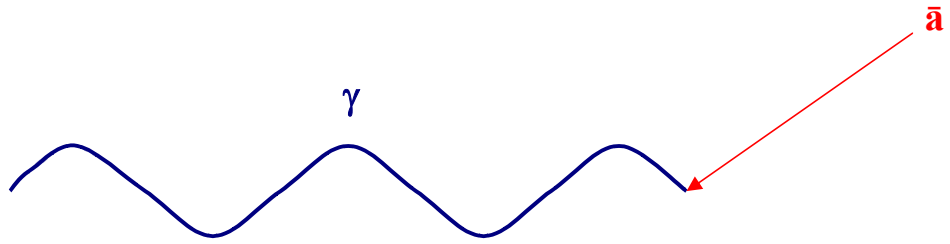


9.6.14 ***Transformation: γ=ā+ä (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

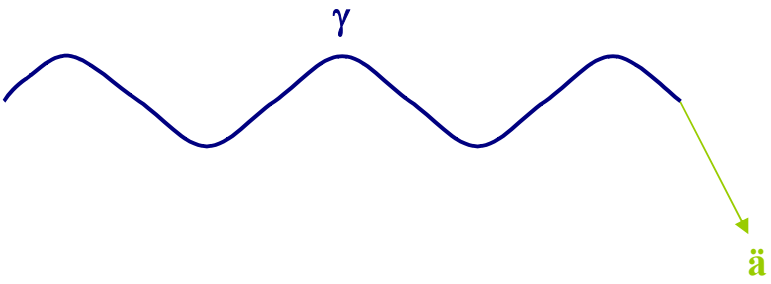
9.6.14.1 ***SP observed transformation of photon into antiparticle-cisparticle pair.***



9.6.14.2 ***STL observed transformation of photon into antiparticle.***

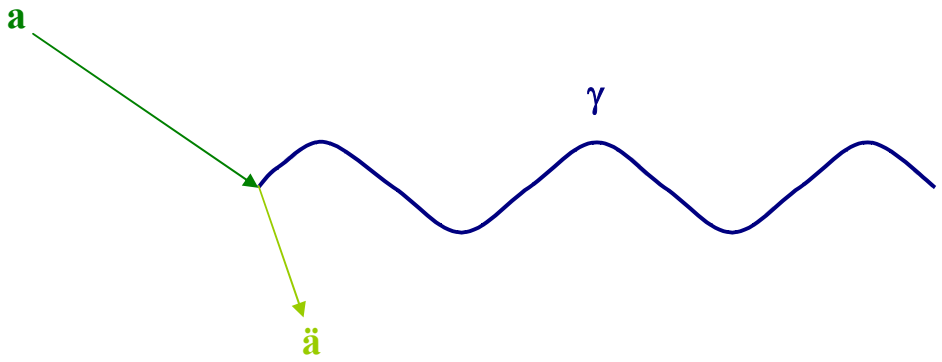


9.6.14.3 ***FTL observed transformation of photon into cisparticle.***

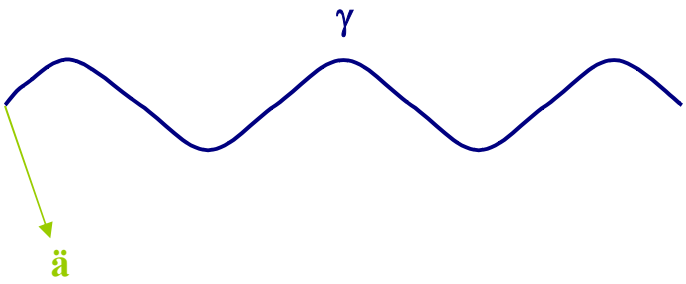


9.6.15 ***Impossible transformation: a≠γ+ä (Charge conserved: C=0+C; Spin violated: ½≠1+½).***

9.6.15.1 ***SP observed impossible transformation of particle into cisparticle.***

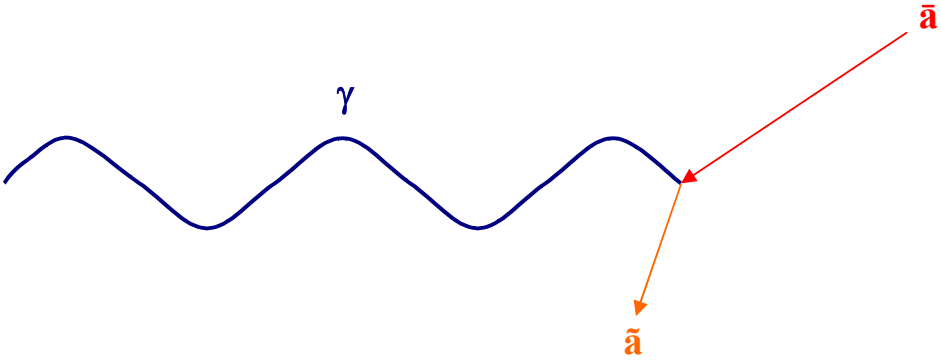


9.6.15.2 ***FTL observed impossible creation from nothing of cisparticle-photon pair.***

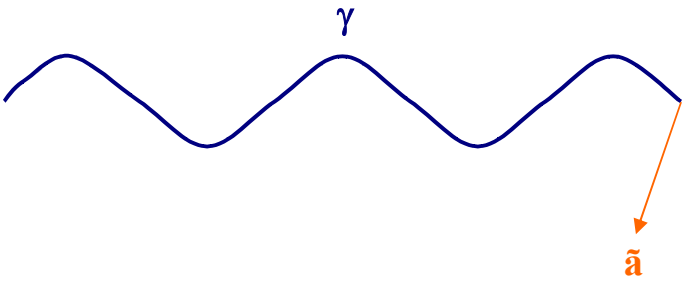


9.6.16 ***Impossible transformation: γ+ã≠ā (Charge conserved: 0–C=–C; Spin violated: 1+½≠½).***

9.6.16.1 ***SP observed impossible transformation of cisantiparticle into antiparticle.***

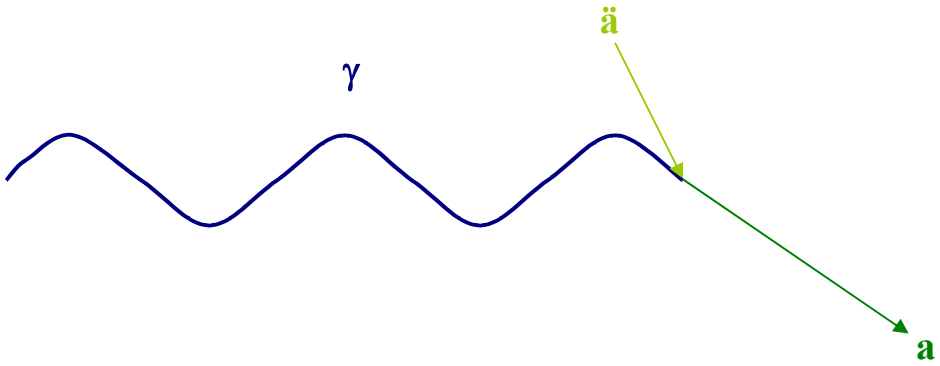


9.6.16.2 ***FTL observed impossible disappearance to nothingness of cisantiparticle-photon pair.***

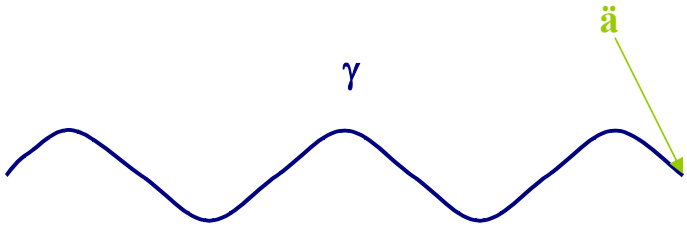


9.6.17 ***Impossible transformation: γ+ä≠a (Charge conserved: 0+C=0; Spin violated: 1+½≠½).***

9.6.17.1 ***SP observed impossible transformation of cisparticle into particle.***

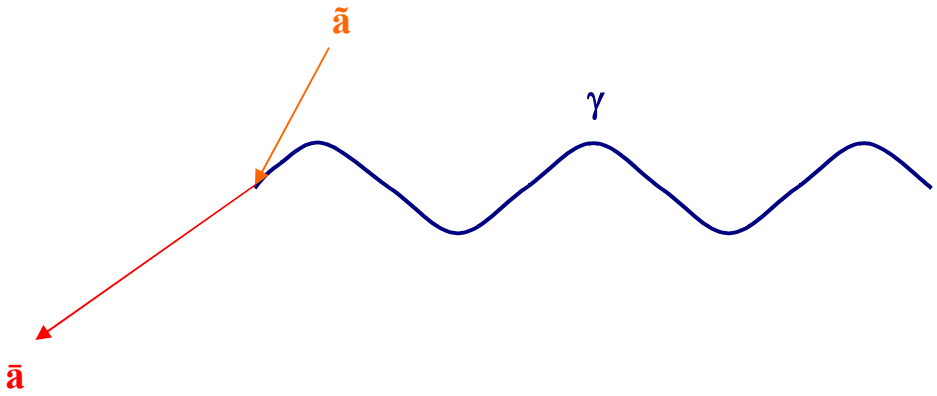


9.6.17.2 ***FTL observed impossible disappearance to nothingness of cisparticle-photon pair.***

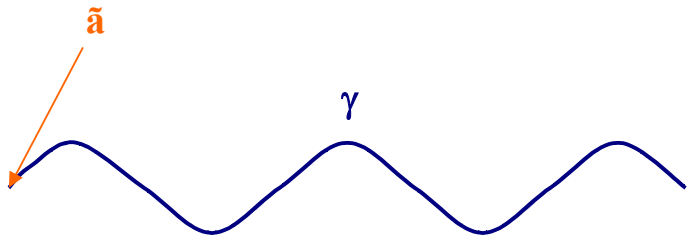


9.6.18 ***Transformation: ā≠γ+ã (Charge conserved: –C=0–C; Spin violated: ½≠1+½).***

9.6.18.1 ***SP observed impossible transformation of antiparticle into cisantiparticle.***

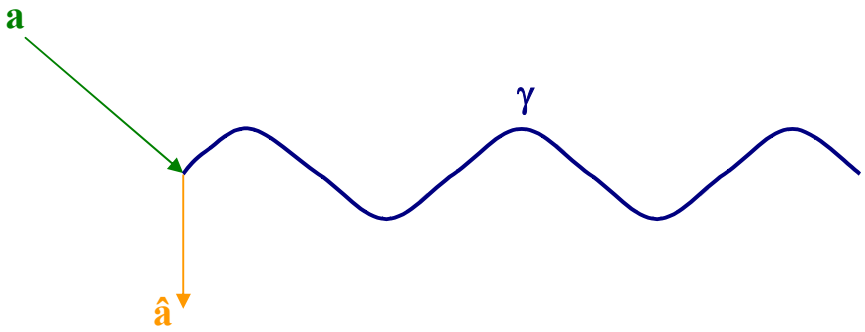


9.6.18.2 ***FTL observed impossible creation from nothing of photon-cisantiparticle pair.***

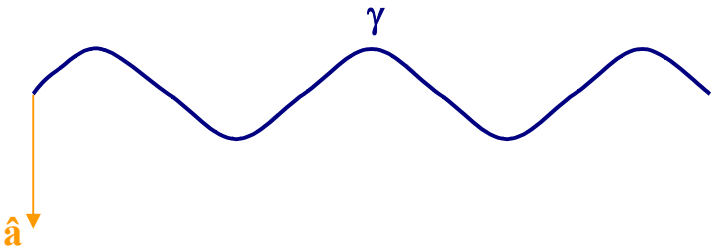


9.6.19 ***Transformation: a+â=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

9.6.19.1 ***SP and STL observed annihilation of particle-nilantiparticle pair into photon.***

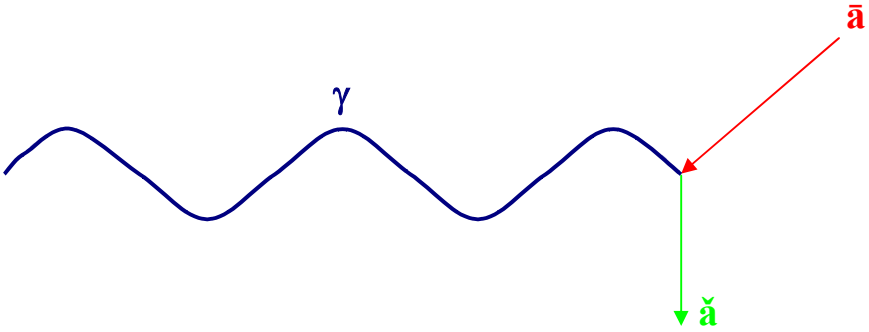


9.6.19.2 ***FTL observed transformation of nilantiparticle into photon.***

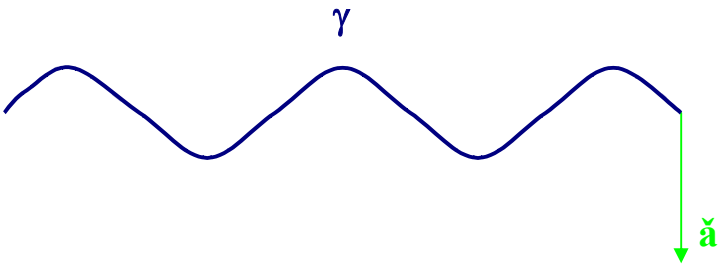


9.6.20 ***Transformation: γ=ā+ă (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

9.6.20.1 ***SP and STL observed transformation of photon into antiparticle-nilparticle pair.***

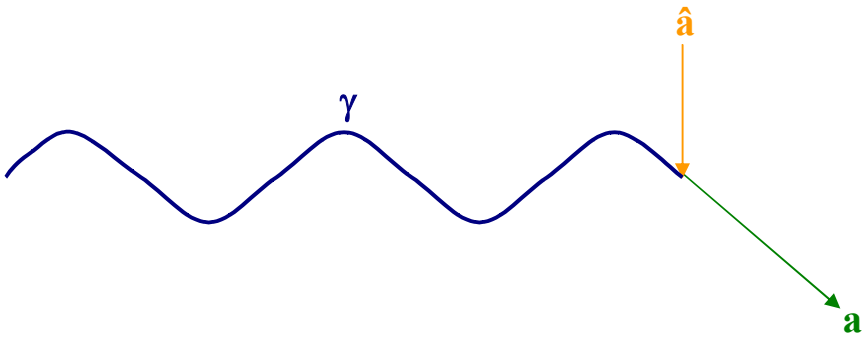


9.6.20.2 ***FTL observed transformation of photon into nilparticle.***

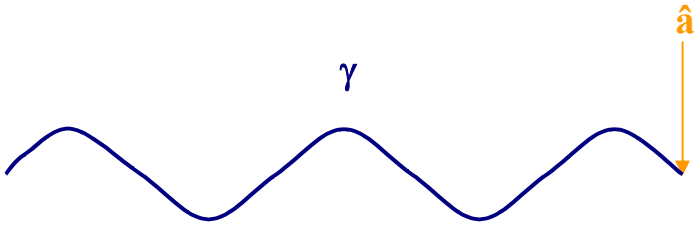


9.6.21 ***Transformation: γ=a+â (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

9.6.21.1 ***SP and STL observed transformation of photon into particle-nilantiparticle pair.***

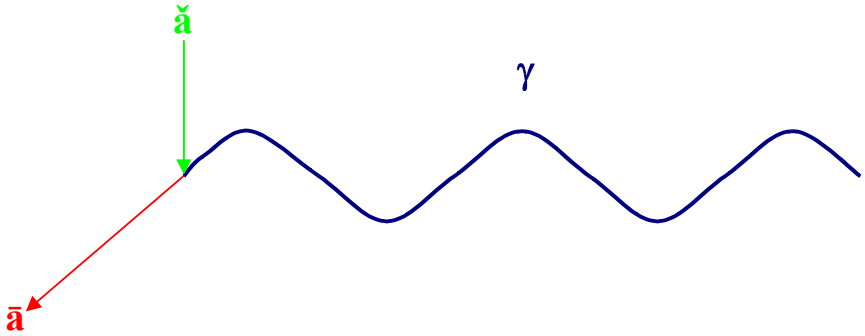


9.6.21.2 ***FTL observed transformation of photon into nilantiparticle.***

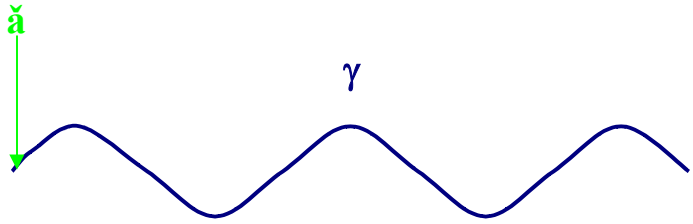


9.6.22 ***Transformation: ā+ă=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

9.6.22.1 ***SP and STL observed annihilation of antiparticle-nilparticle pair into photon.***

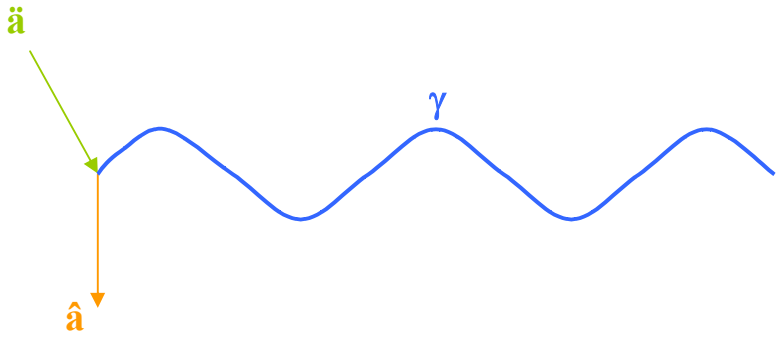


9.6.22.2 ***FTL observed transformation of nilparticle into photon.***

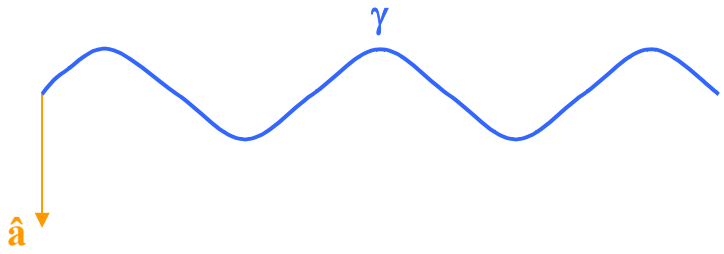


9.6.23 ***Transformation: ä+â=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

9.6.23.1 ***SP and FTL observed annihilation of cisparticle-nilantiparticle pair into photon.***

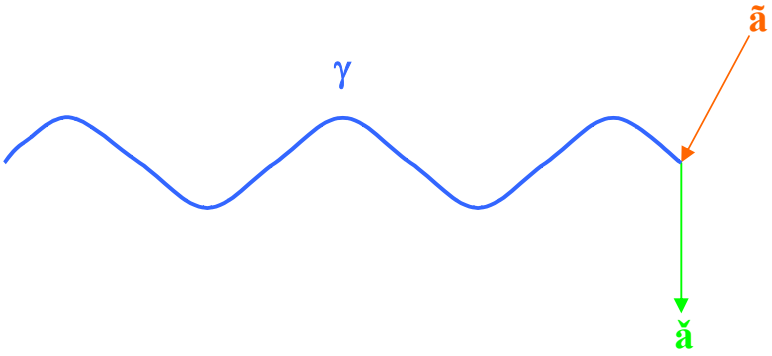


9.6.23.2 ***STL observed transformation of nilantiparticle into photon.***

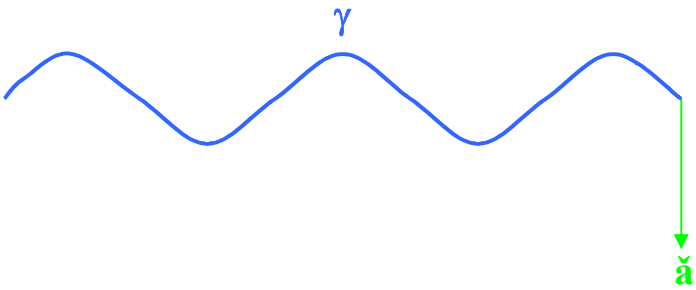


9.6.24 ***Transformation: γ=ã+ă (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

9.6.24.1 ***SP and FTL observed transformation of photon into cisantiparticle-nilparticle pair.***

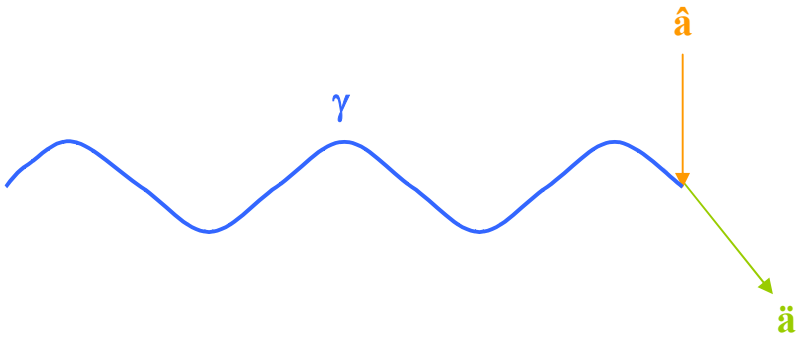


9.6.24.2 ***STL observed transformation of photon into nilparticle.***

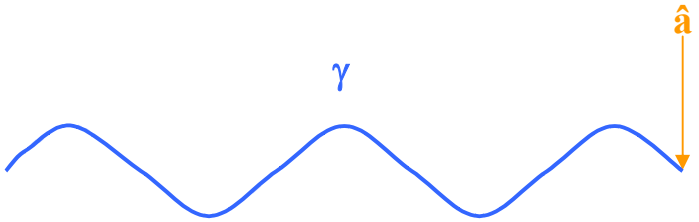


9.6.25 ***Transformation: γ=ä+â (Charge conserved: 0=C–C; Spin conserved: 1=½+½).***

9.6.25.1 ***SP and FTL observed transformation of photon into cisparticle-nilantiparticle pair.***

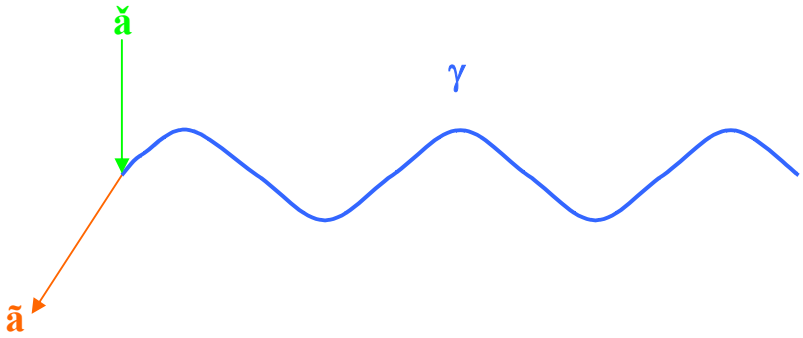


9.6.25.2 ***STL observed transformation of photon into nilantiparticle.***

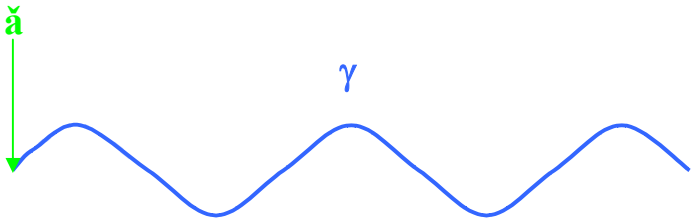


9.6.26 ***Transformation: ã+ă=γ (Charge conserved: C–C=0; Spin conserved: ½+½=1).***

9.6.26.1 ***SP and FTL observed annihilation of cisantiparticle-nilparticle pair into photon.***

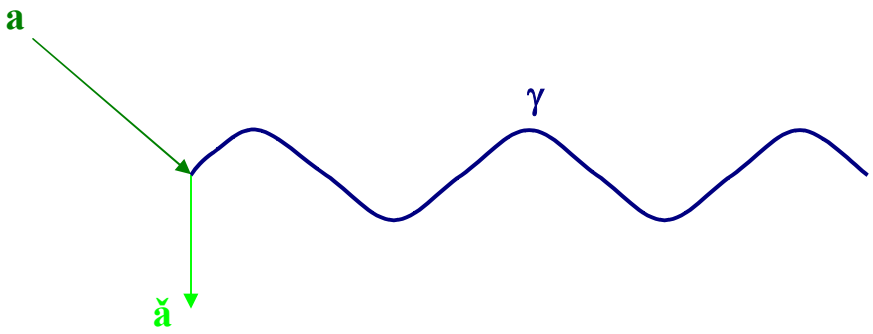


9.6.26.2 ***STL observed transformation of nilparticle into photon.***

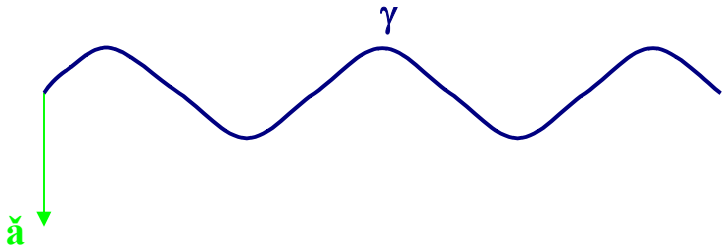


9.6.27 ***Impossible transformation: a≠γ+ă (Charge conserved: –C=0–C; Spin violated: ½≠1+½).***

9.6.27.1 ***SP and STL observed impossible annihilation of particle-nilparticle pair into photon.***

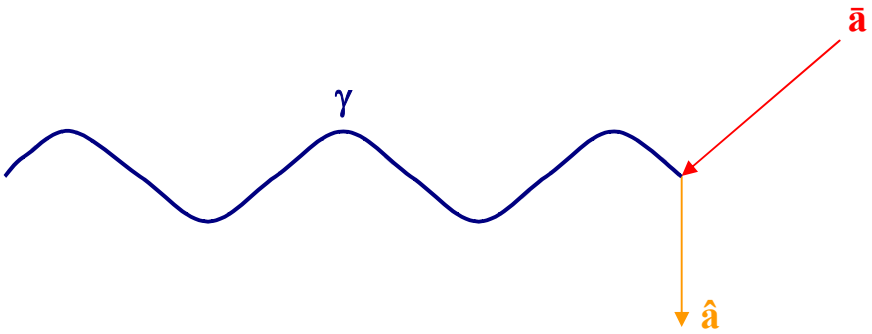


9.6.27.2 ***FTL observed impossible creation from nothing of nilparticle-photon pair.***

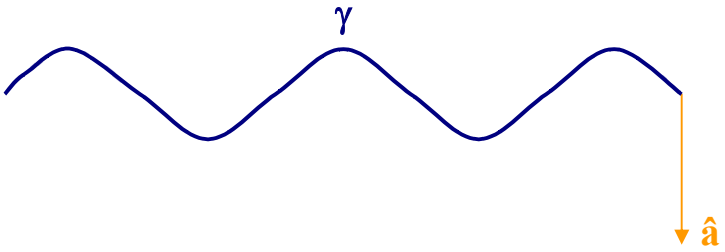


9.6.28 ***Impossible transformation: γ+â=ā (Charge conserved: 0+C=C; Spin violated: 1+½≠½).***

9.6.28.1 ***SP and STL observed impossible transformation of nilantiparticle into antiparticle.***

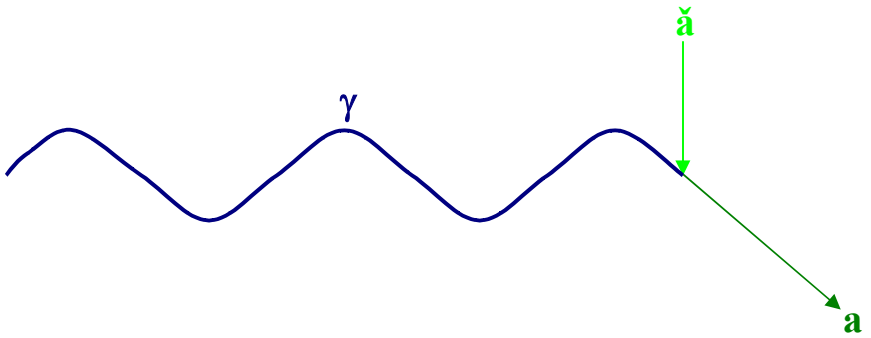


9.6.28.2 ***FTL observed impossible transformation of photon into nilantiparticle.***

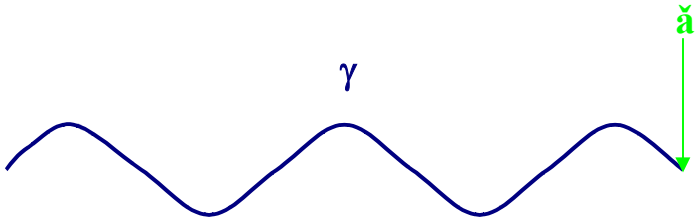


9.6.29 ***Impossible transformation: γ+ă≠a (Charge conserved: 0–C=–C; Spin violated: 1+½≠½).***

9.6.29.1 ***SP and STL observed impossible transformation of nilparticle into particle.***

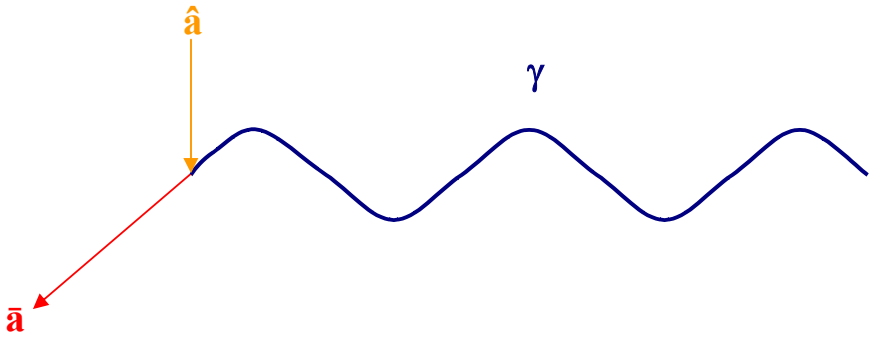


9.6.29.2 ***FTL observed impossible disappearance to nothingness of photon-nilparticle pair.***

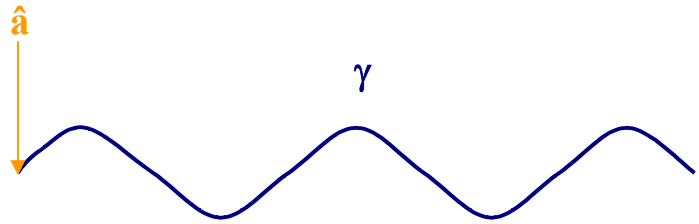


9.6.30 ***Impossible transformation: ā≠γ+â (Charge conserved: C=0+C; Spin violated: ½≠1+½).***

9.6.30.1 ***SP and STL observed impossible transformation of antiparticle into nilantiparticle.***

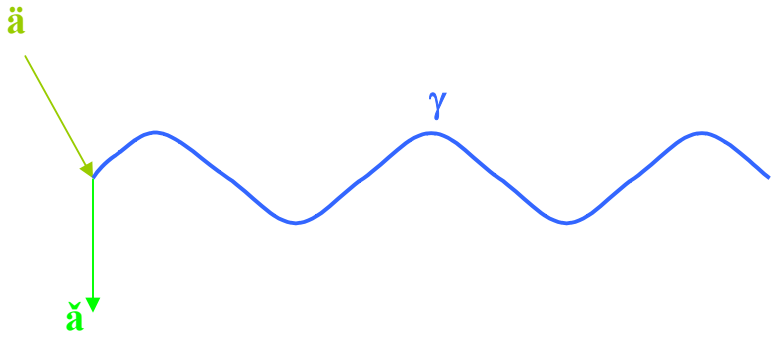


9.6.30.2 ***FTL observed impossible creation from nothing of nilantiparticle-photon pair.***

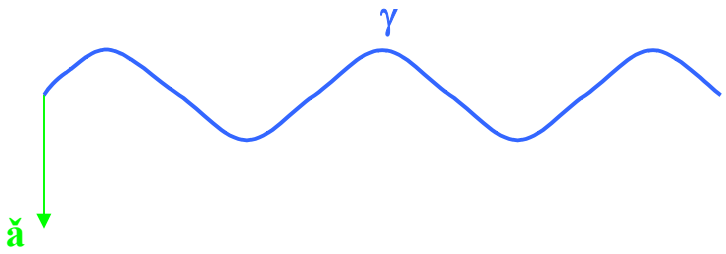


9.6.31 ***Impossible transformation: ä≠γ+ă (Charge conserved: –C=0–C; Spin violated: ½≠1+½).***

9.6.31.1 ***SP and FTL observed impossible transformation of cisparticle into nilparticle.***

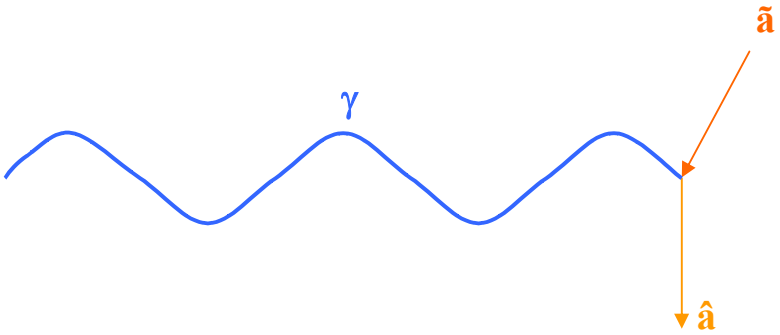


9.6.31.2***STL observed impossible creation from nothing of nilparticle-photon pair.***

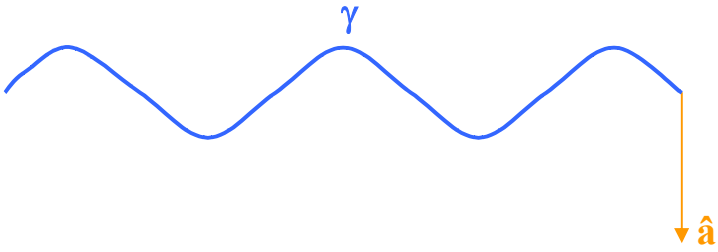


9.6.32 ***Impossible transformation: γ+â≠ã (Charge conserved: 0+C=C; Spin violated: 1+½≠½).***

9.6.32.1 ***SP and FTL observed impossible transformation of nilantiparticle into cisantiparticle.***

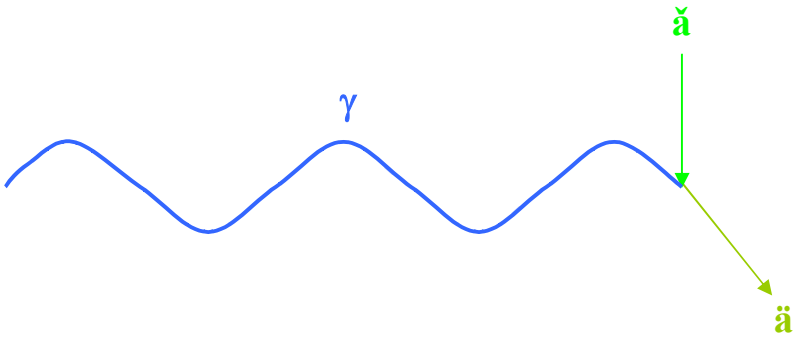


9.6.32.2 ***STL observed impossible disappearance to nothingness of photon-nilantiparticle pair.***

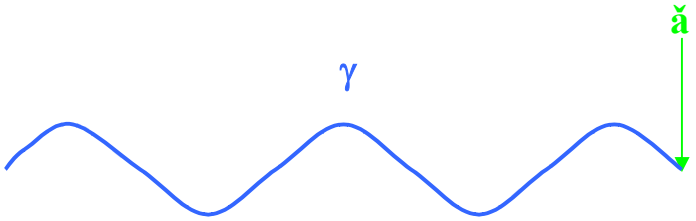


9.6.33 ***Impossible transformation: γ+ă≠ä (Charge conserved: 0=C–C; Spin violated: 1+½≠½).***

9.6.33.1 ***SP and FTL observed impossible transformation of nilparticle into cisparticle.***

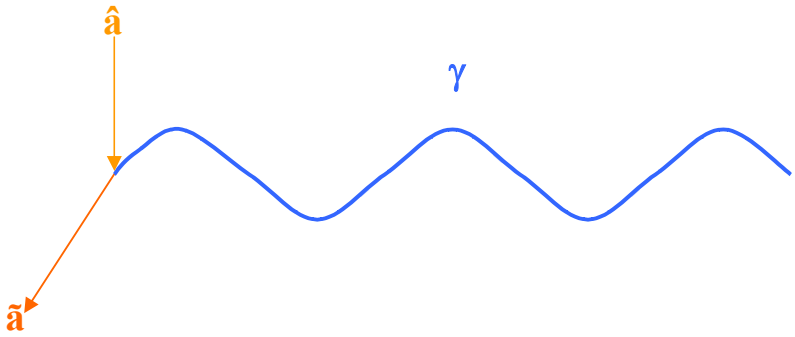


9.6.33.2 ***STL observed impossible disappearance to nothingness of photon-nilparticle pair.***

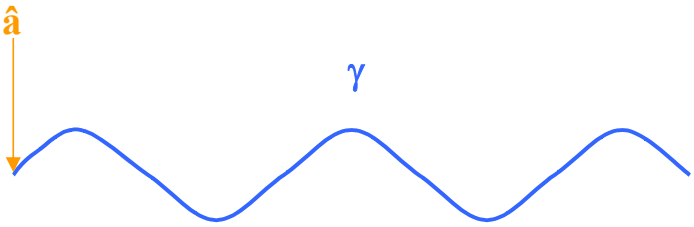


9.6.34 ***Impossible transformation: ã≠â+γ (Charge conserved: C–C=0; Spin violated: ½≠½+1).***

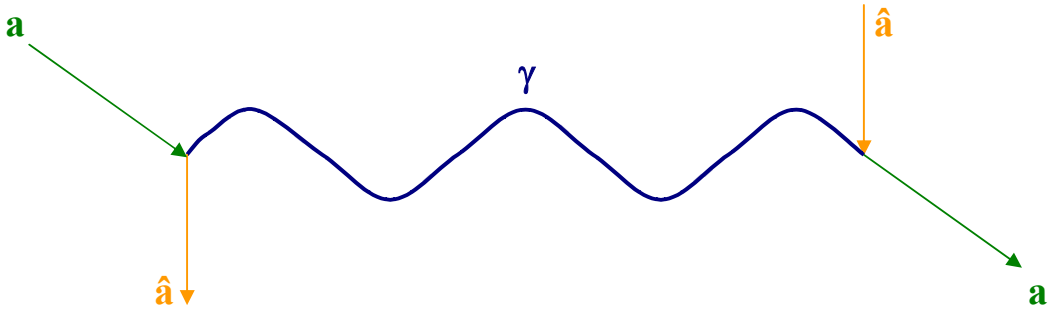
9.6.34.1 ***SP and FTL observed impossible transformation of cisantiparticle into nilantiparticle.***



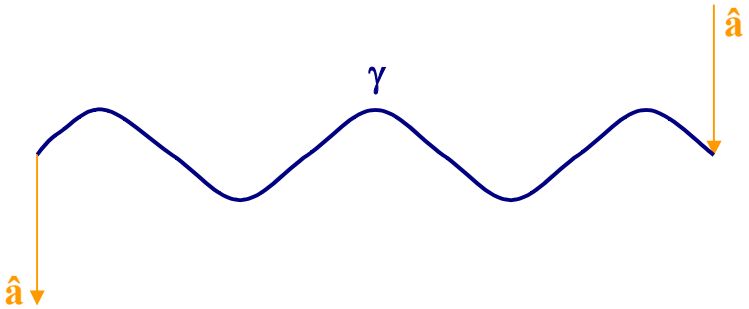
9.6.34.2 ***STL observed impossible creation from nothing of nilantiparticle-photon pair.***



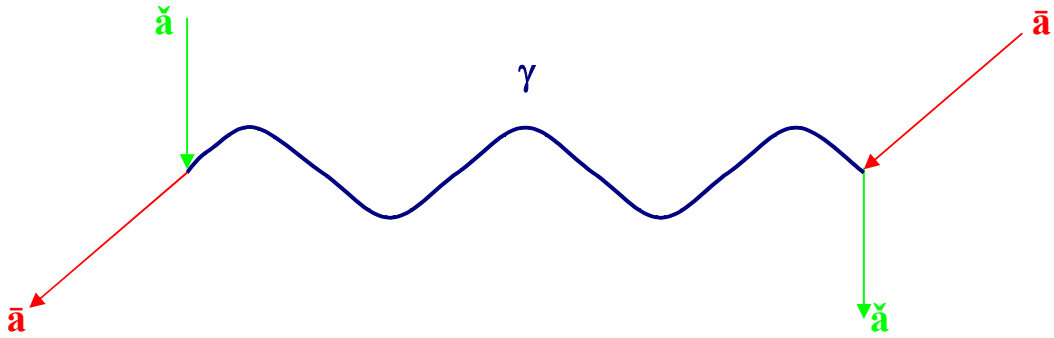
9.6.35 ***SP and STL observed teletransport of particle.***



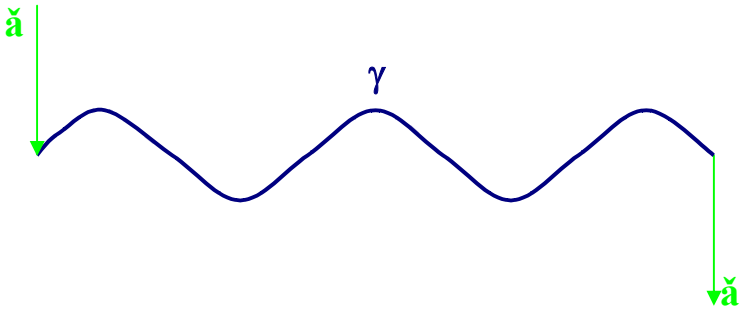
9.6.35.1 ***FTL observed transformation nilantiparticle↔photon.***



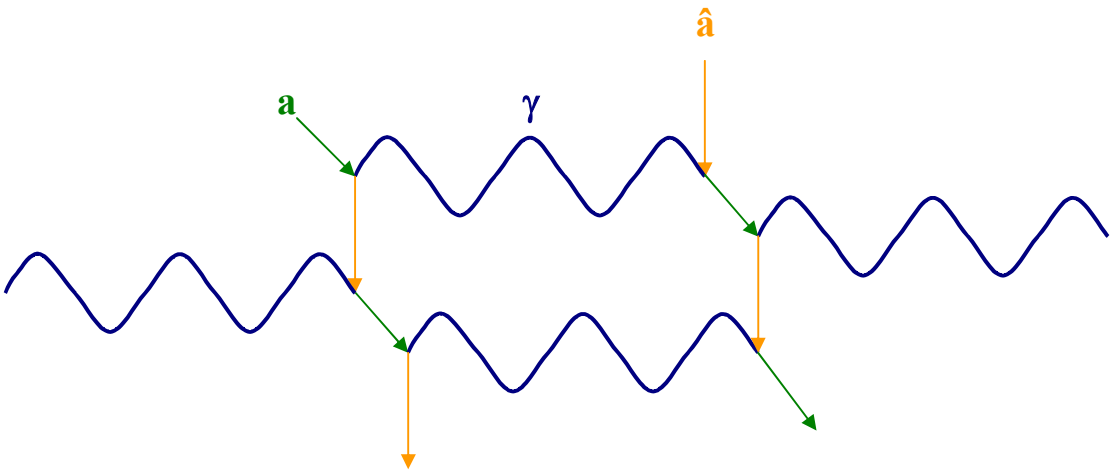
9.6.36 ***SP and STL observed teletransport of antiparticle.***



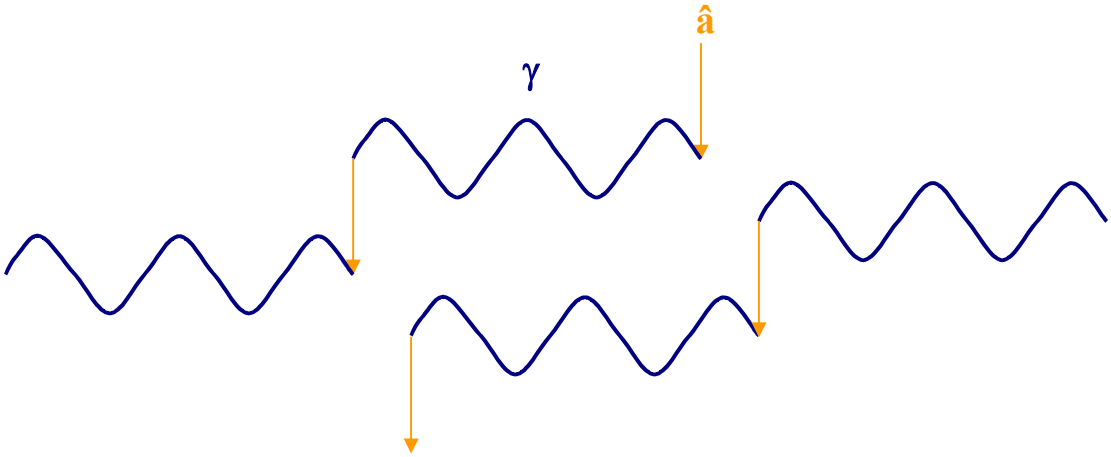
9.6.36.1 ***FTL observed transformation nilparticle↔photon.***



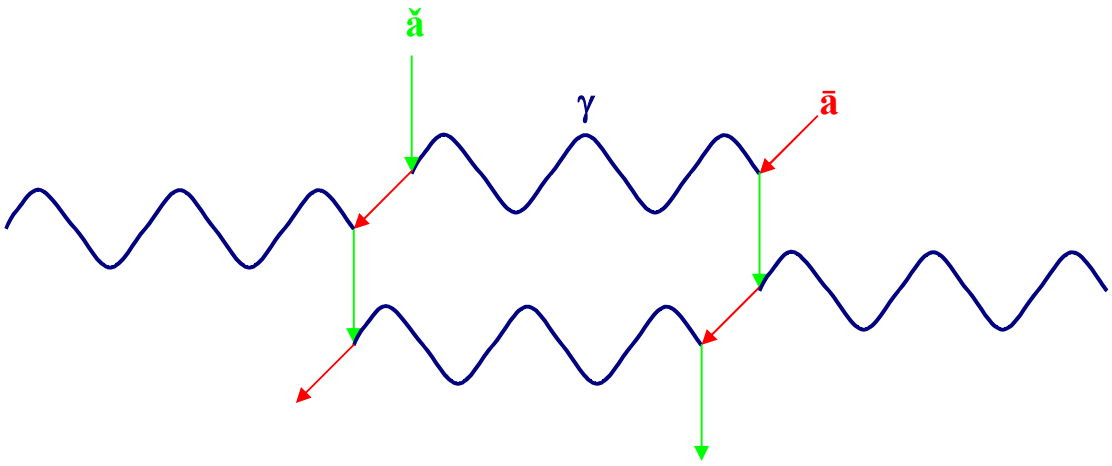
9.6.37 ***SP and STL observed matter-nilantimatter lattice.***



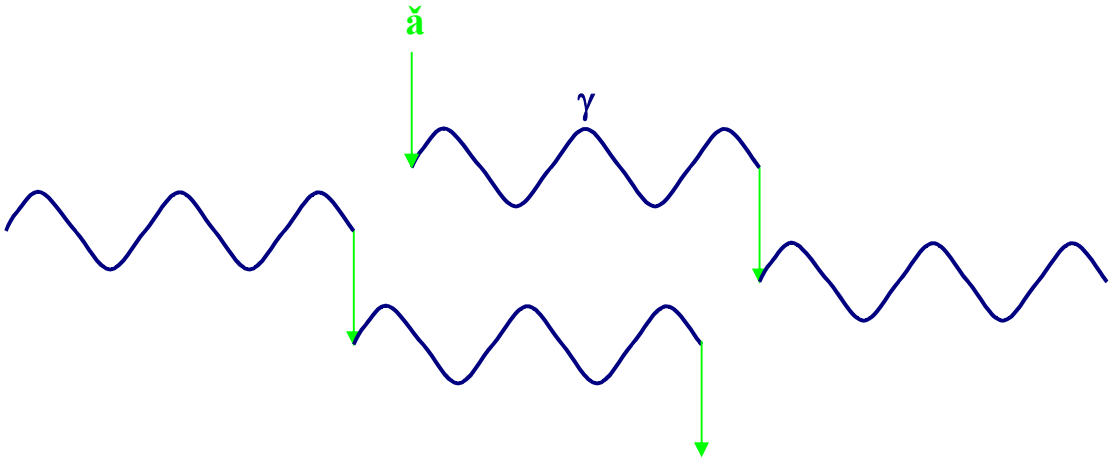
9.6.37.1 ***FTL observed matter-nilantimatter lattice.***



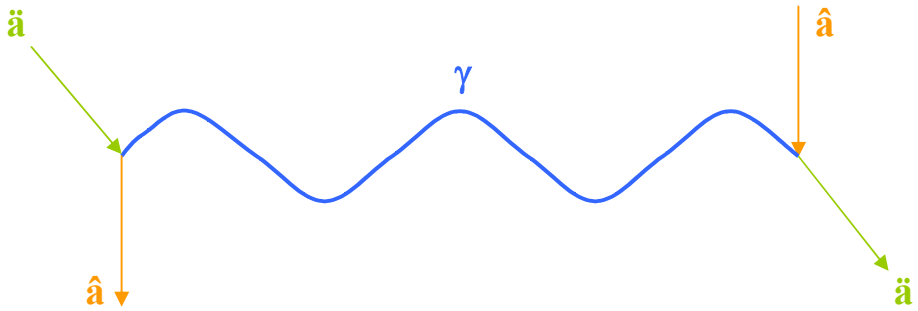
9.6.38 ***SP and STL observed antimatter-nilmatter lattice.***



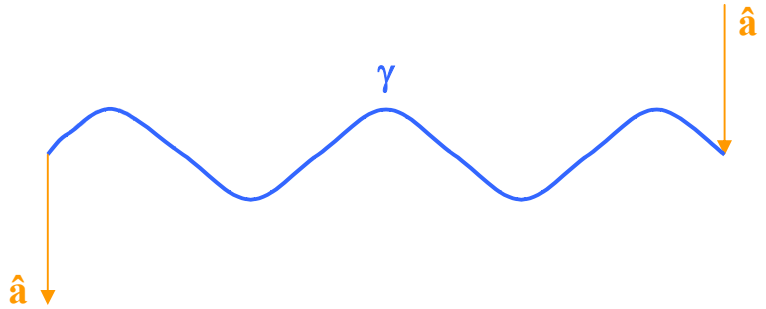
9.6.38.1 ***FTL observed antimatter-nilmatter lattice.***



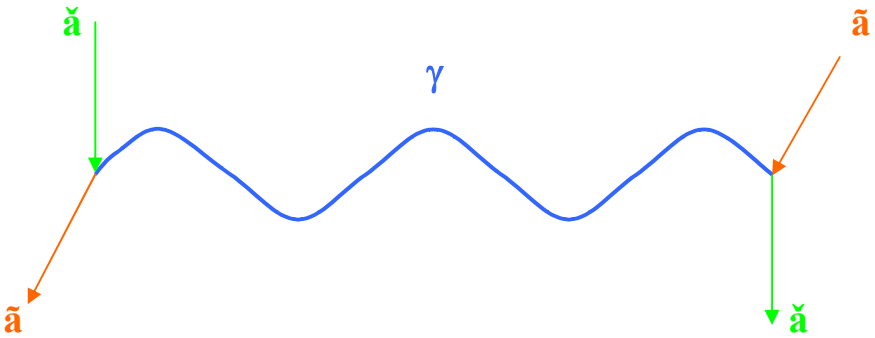
9.6.39 ***SP and FTL observed teletransport of cisparticle.***



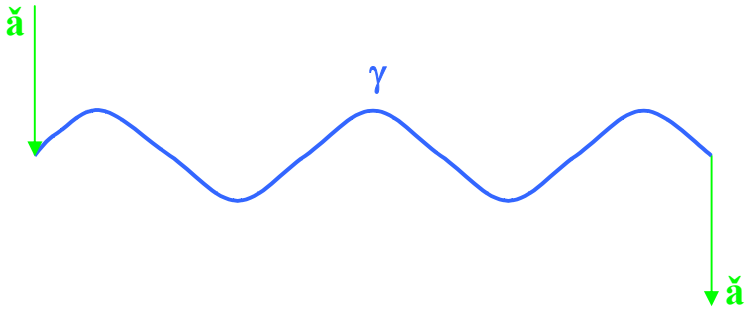
9.6.39.1 ***STL observed transformation nilantiparticle↔photon.***



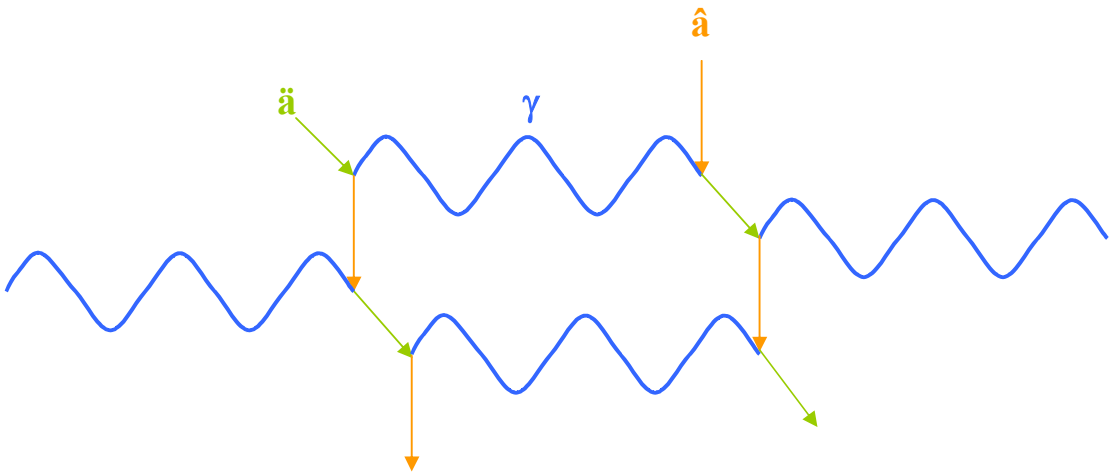
9.6.40 ***SP and FTL observed teletransport of cisantiparticle.***



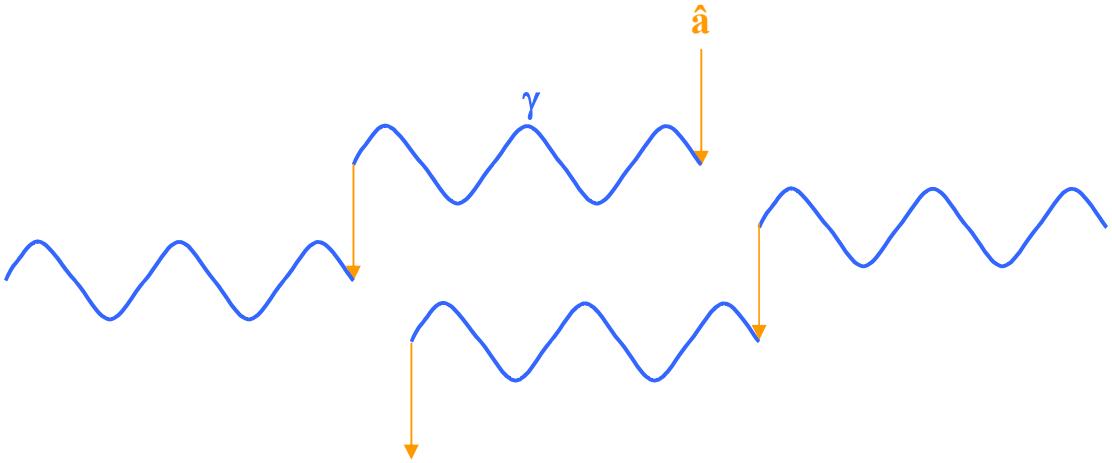
9.6.40.1 ***STL observed transformation nilparticle↔photon.***



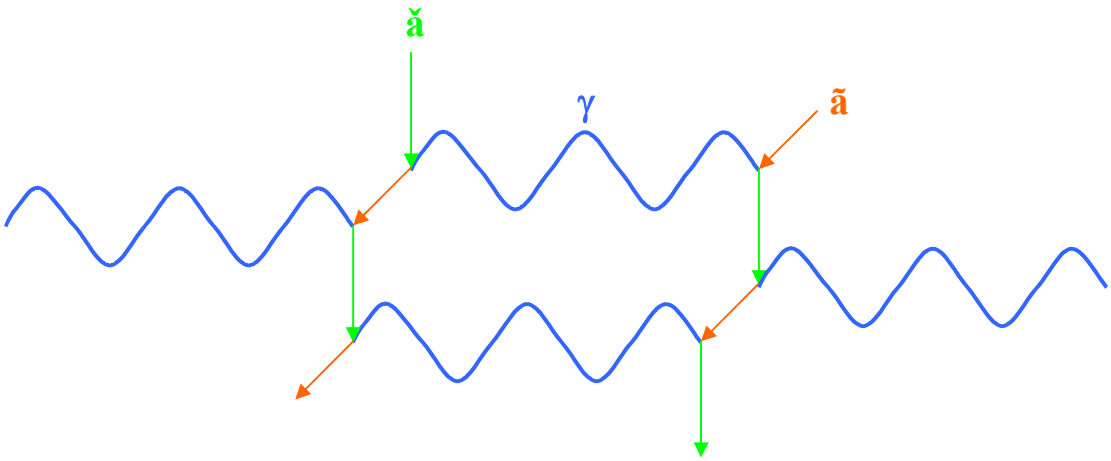
9.6.41 ***SP and FTL observed cismatter-nilantimatter lattice.***



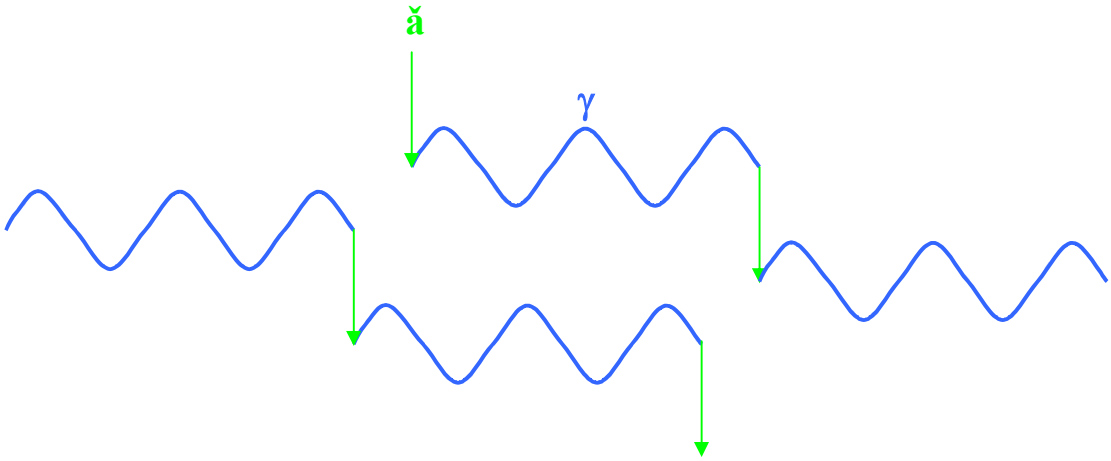
9.6.41.1 ***STL observed cismatter-nilantimatter lattice.***



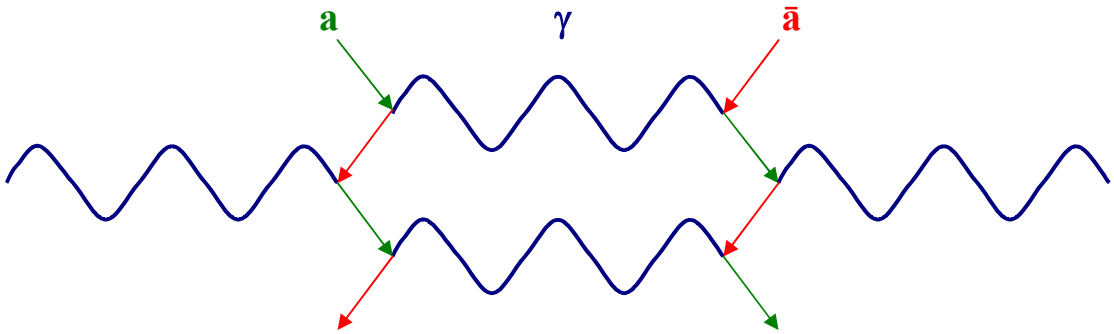
9.6.42 ***SP and FTL observed cisantimatter-nilmatter lattice.***



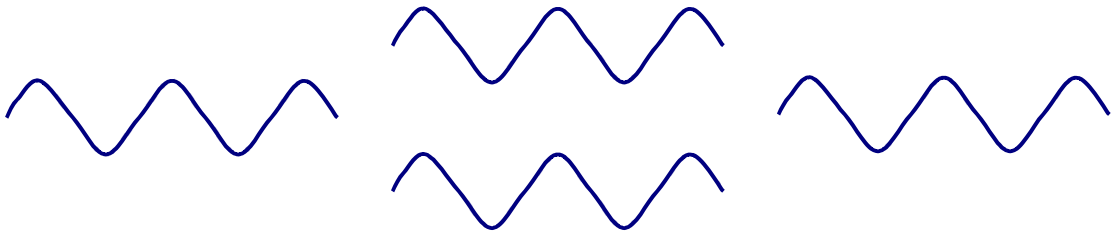
9.6.42.1 ***STL observed cisantimatter-nilmatter lattice.***



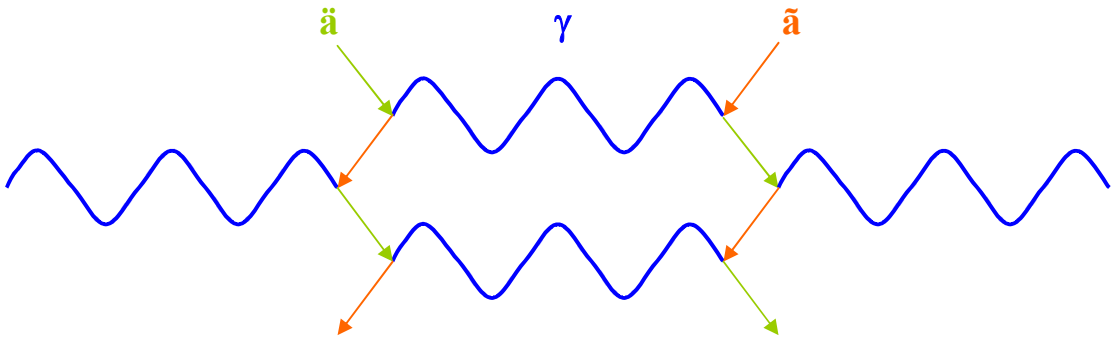
9.6.43 ***SP and STL observed matter-antimatter lattice.***



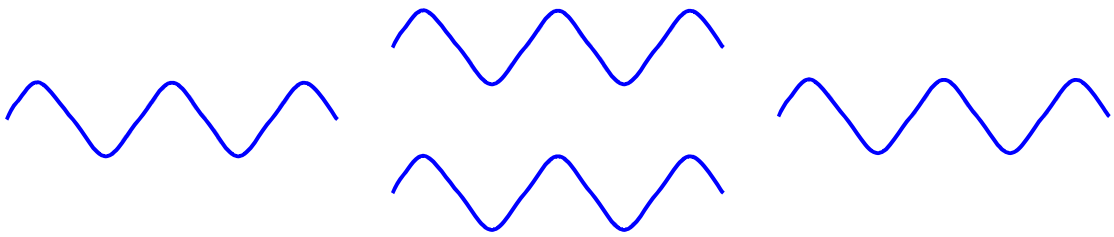
9.6.43.1 ***FTL observed matter-antimatter lattice.***



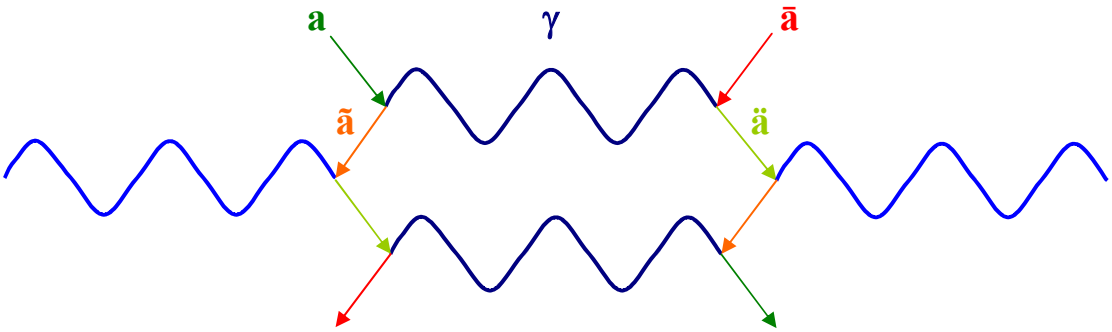
9.6.44 ***SP and FTL observed cismatter-cisantimatter lattice.***



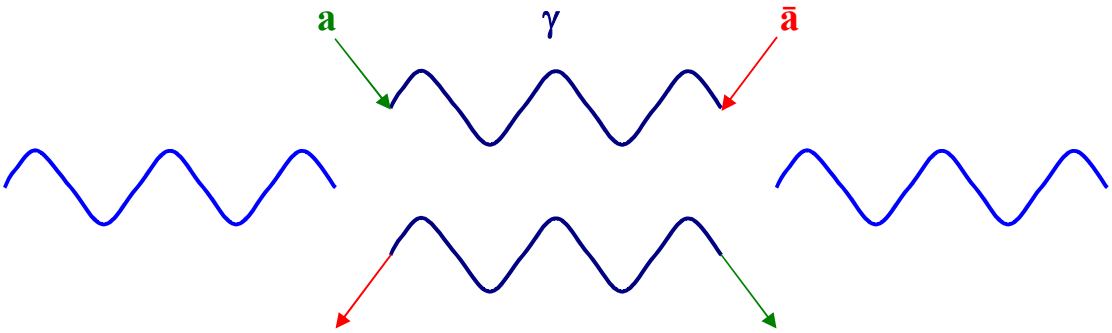
9.6.44.1 ***STL observed cismatter-cisantimatter lattice.***



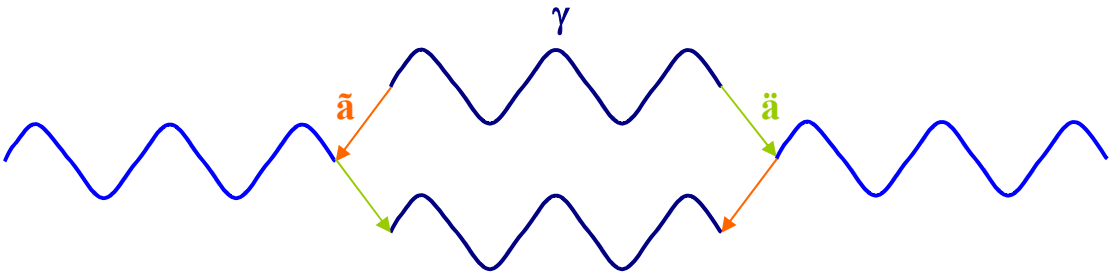
9.6.45 ***SP observed external matter-antimatter mixed lattice.***



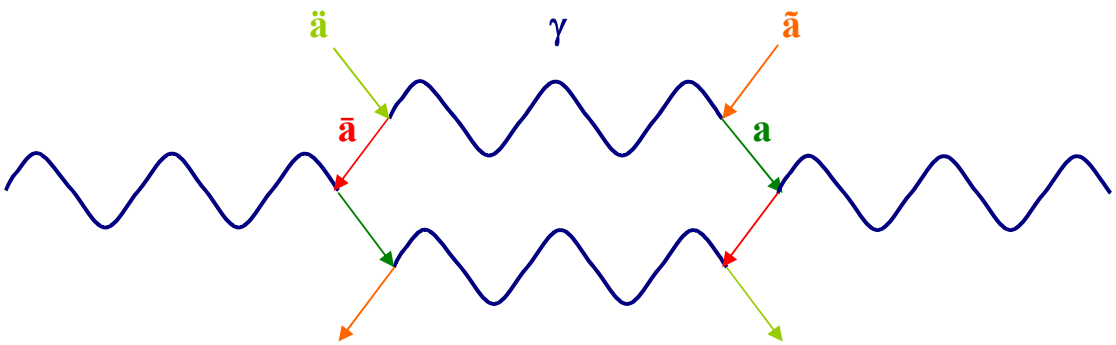
9.6.45.1 ***STL observed external matter-antimatter mixed lattice.***



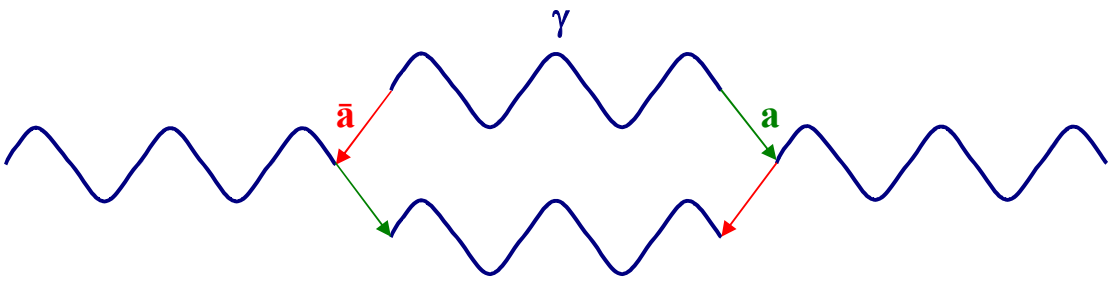
9.6.45.2 ***FTL observed external matter-antimatter mixed lattice.***



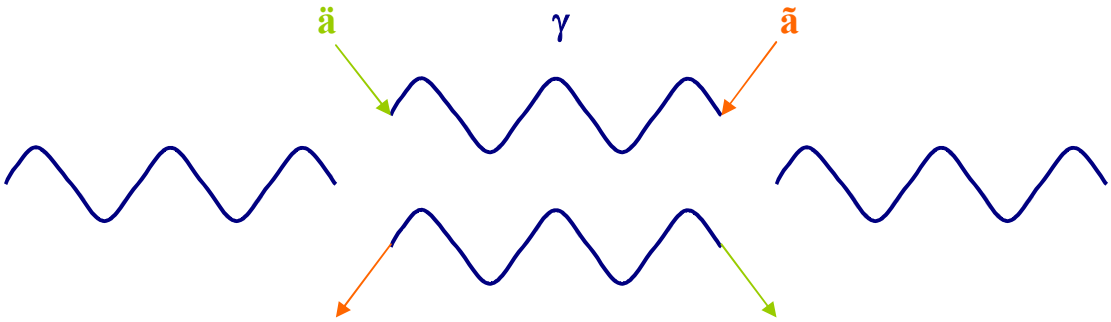
9.6.46 ***SP observed internal matter-antimatter mixed lattice.***



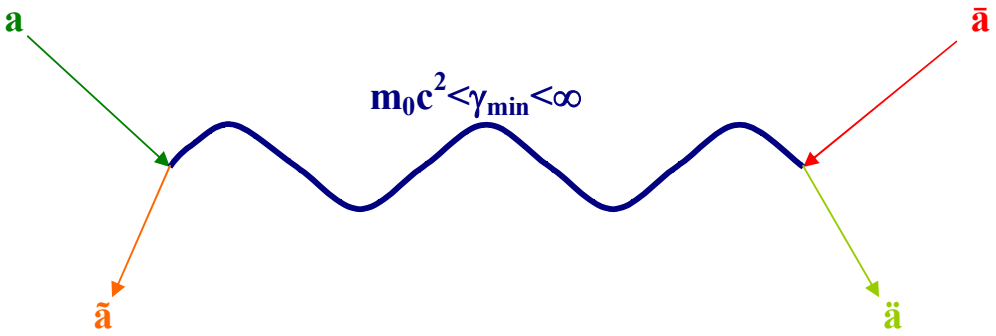
9.6.46.1 ***STL observed internal matter-antimatter mixed lattice.***



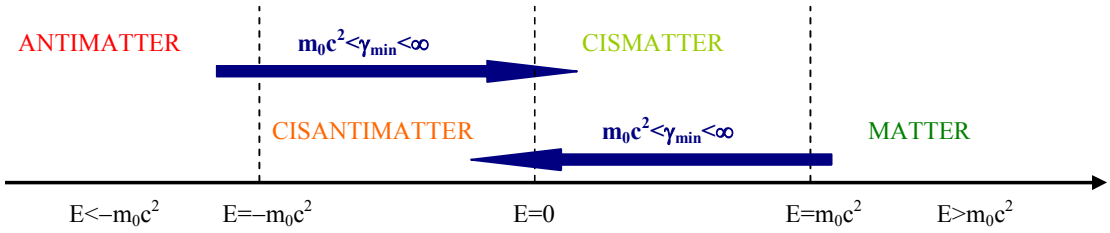
9.6.46.2 ***FTL observed internal matter-antimatter mixed lattice.***



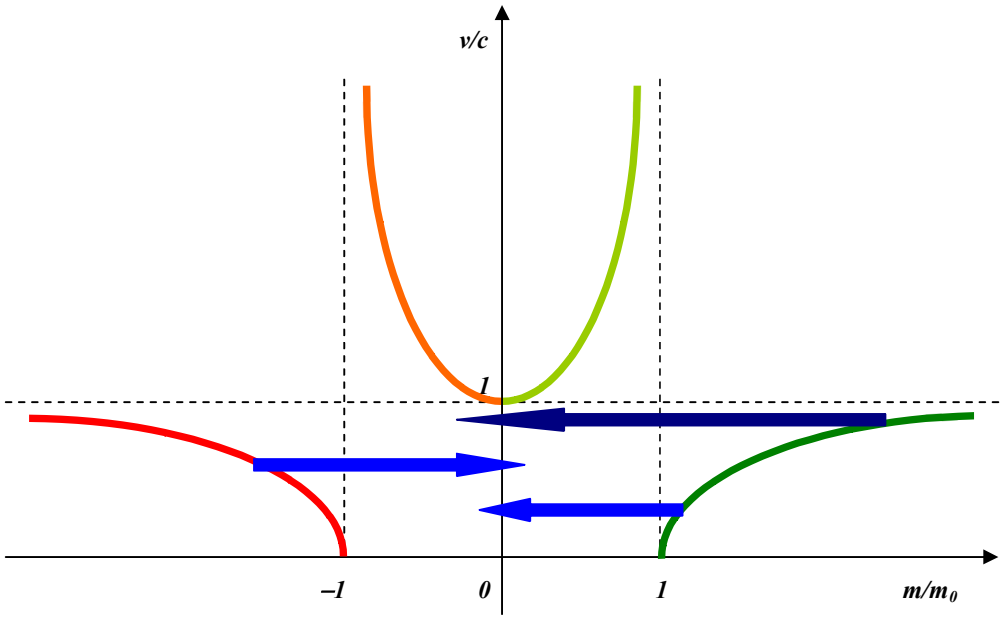
9.6.47 ***SP observed transformation of particle-cisantiparticle pair into antiparticle-cisparticle's.***



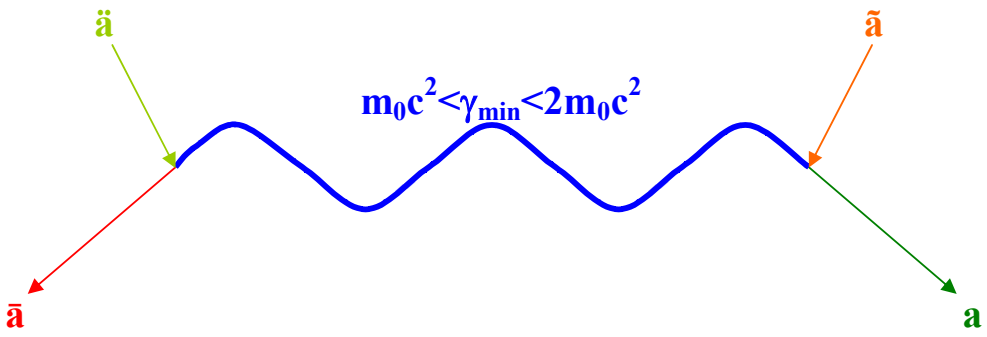
9.6.47.1 ***γ_{min} necessary to enter cismass depends on particle's energy, between $\pm m_0c^2$ and $\pm\infty$.***



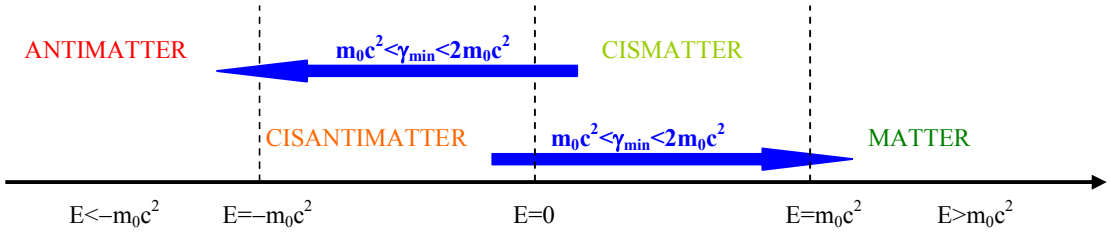
9.6.47.2 ***There is not a minimum energy sufficient for any transition transmass→cismass.***



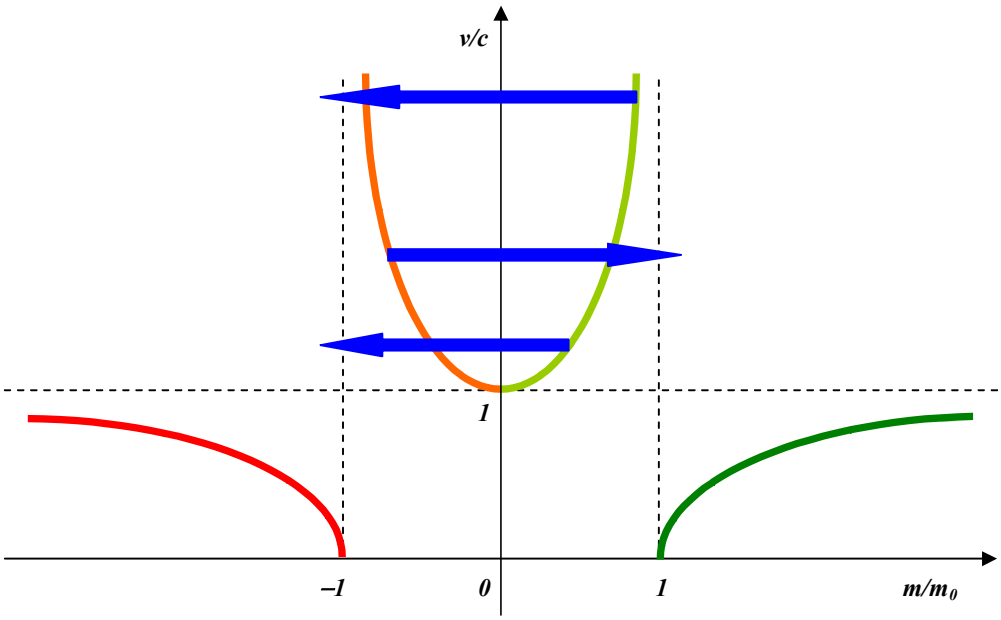
9.6.48 ***SP observed transformation of antiparticle-cisparticle pair into particle-cisantiparticle's.***



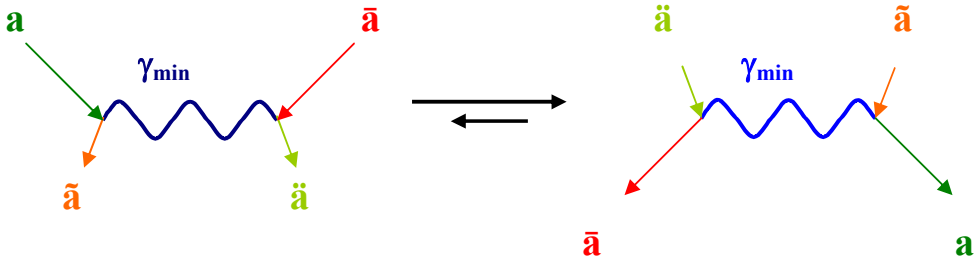
9.6.48.1 ***γ_{min} to leave cismass depends on cisparticle's energy, between $-m_0c^2$ and $+m_0c^2$.***



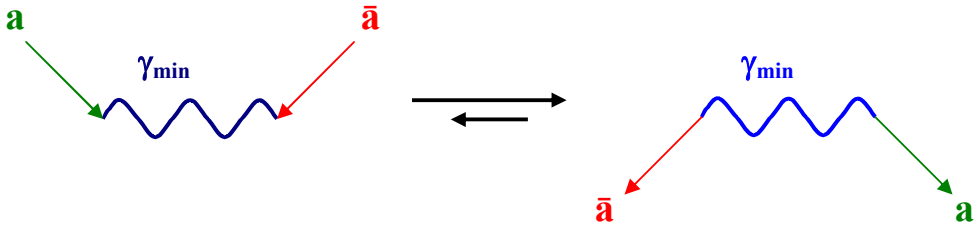
9.6.48.2 ***Minimum energy sufficient for any transition cismass→transmass: $E_{min}=2m_0c^2$.***



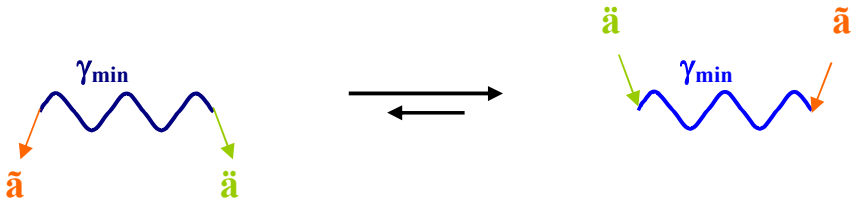
9.6.49 ***SP observed energetically favourite matter and cisantimatter.***



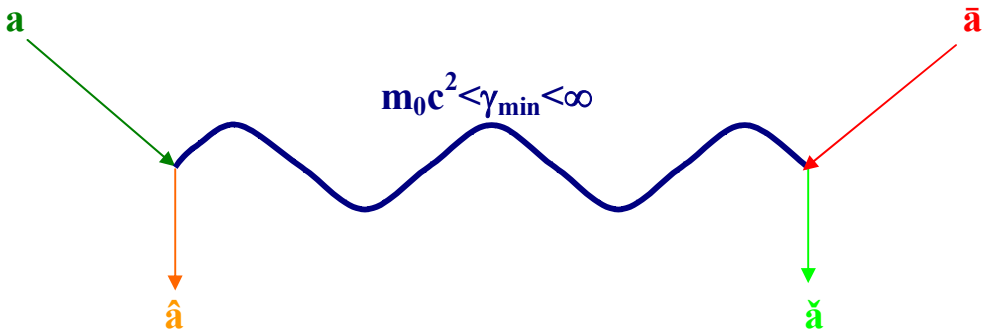
9.6.49.1 ***STL observed violation of CP symmetry in favour of matter.***



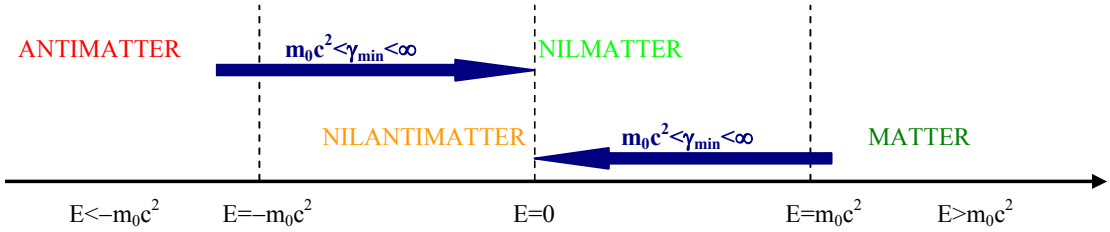
9.6.49.2 ***FTL observed violation of CP symmetry in favour of cisantimatter.***



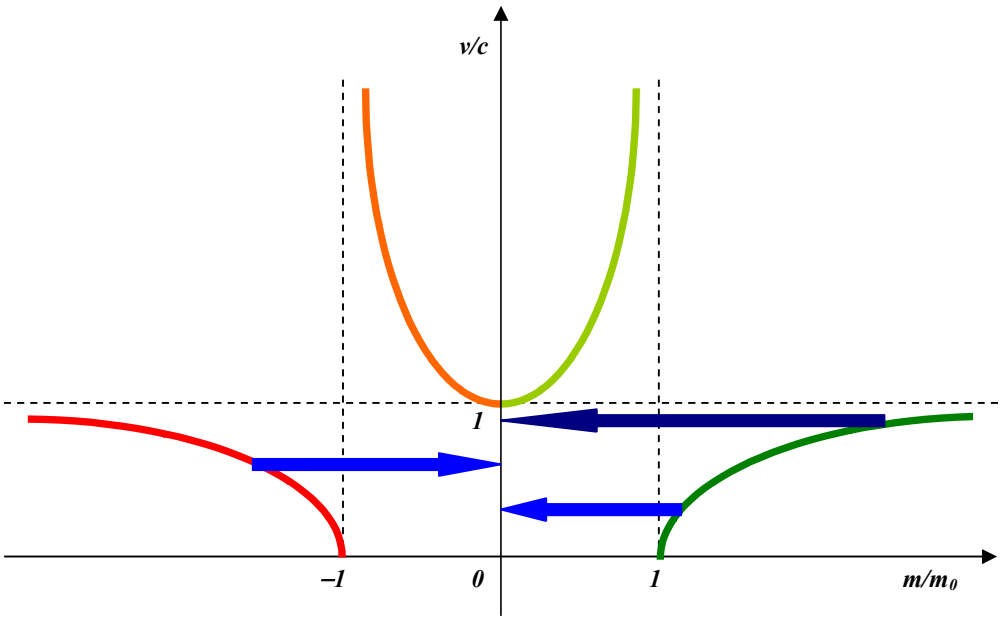
9.6.50 ***SP observed transformation of particle-nilantiparticle pair into antiparticle-nilparticle's.***



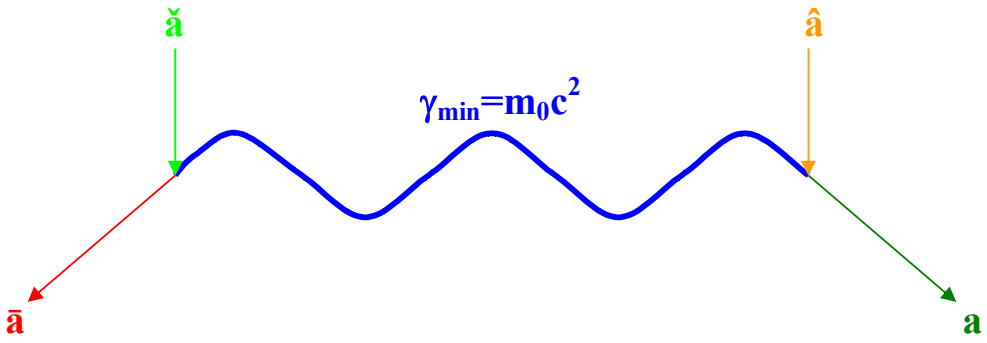
9.6.50.1 ***γ_{min} necessary to become nilmass depends on particle's energy, between $\pm m_0c^2$ and $\pm\infty$.***



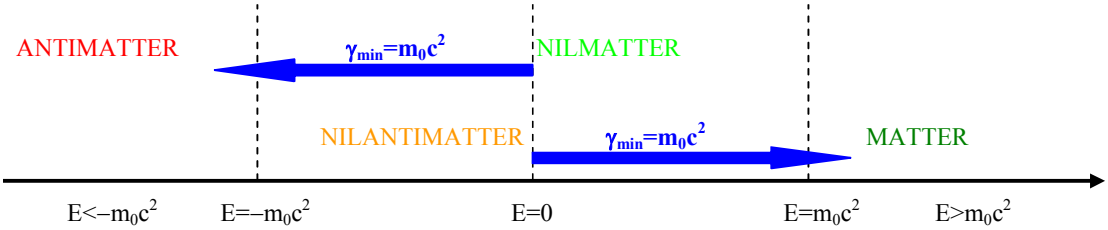
9.6.50.2 ***There is not a minimum energy sufficient for any transition transmass→nilmass.***



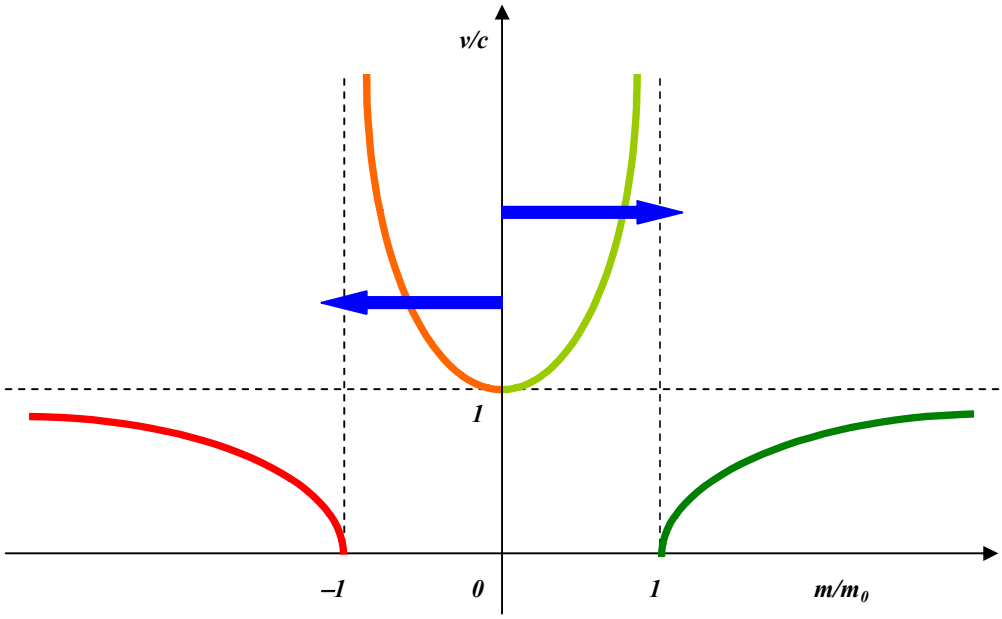
9.6.51 ***SP observed transformation of antiparticle-nilparticle pair into particle-nilantiparticle's.***



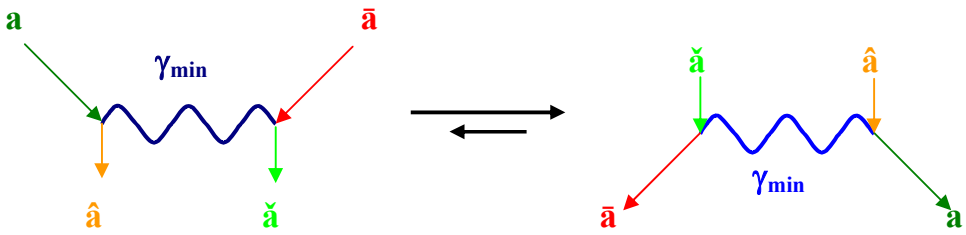
9.6.51.1 ***γ_{min} necessary to come out of nilmass: $\pm m_0c^2$.***



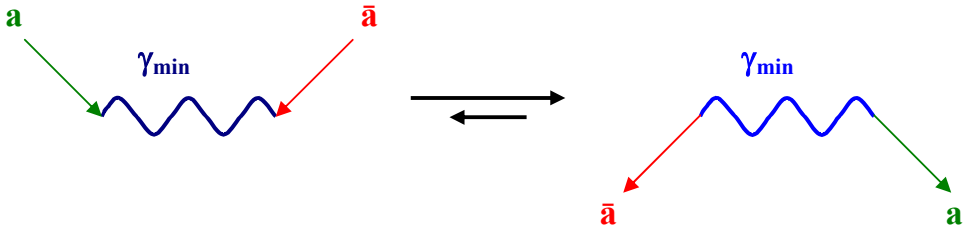
9.6.51.2 ***Minimum energy sufficient for any transition nilmass→transmass: $E_{min}=m_0c^2$.***



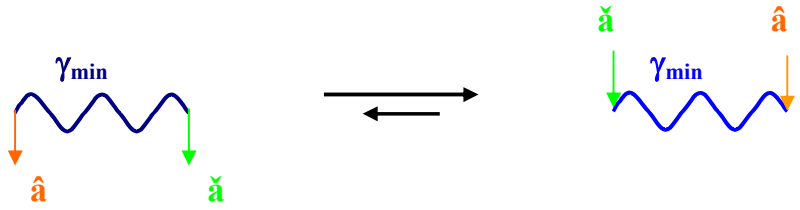
9.6.52 ***SP observed energetically favourite matter and nilantimatter.***



9.6.52.1 ***STL observed violation of CP symmetry in favour of matter.***

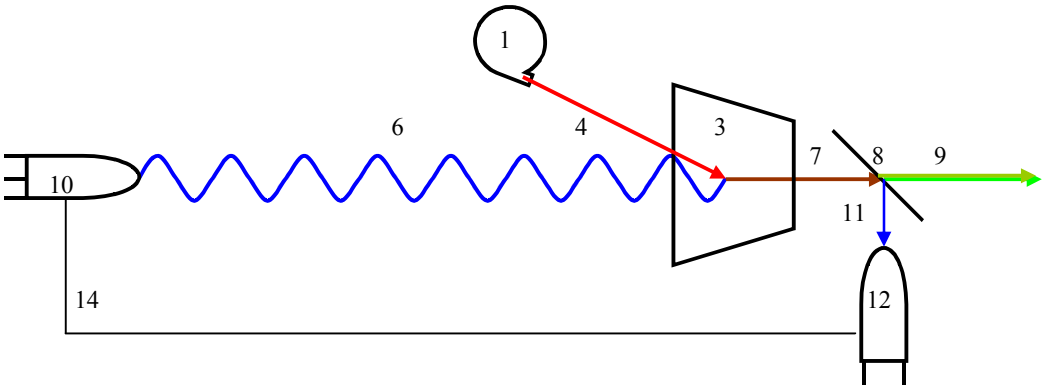


9.6.52.2 ***FTL observed violation of CP symmetry in favour of nilantimatter.***

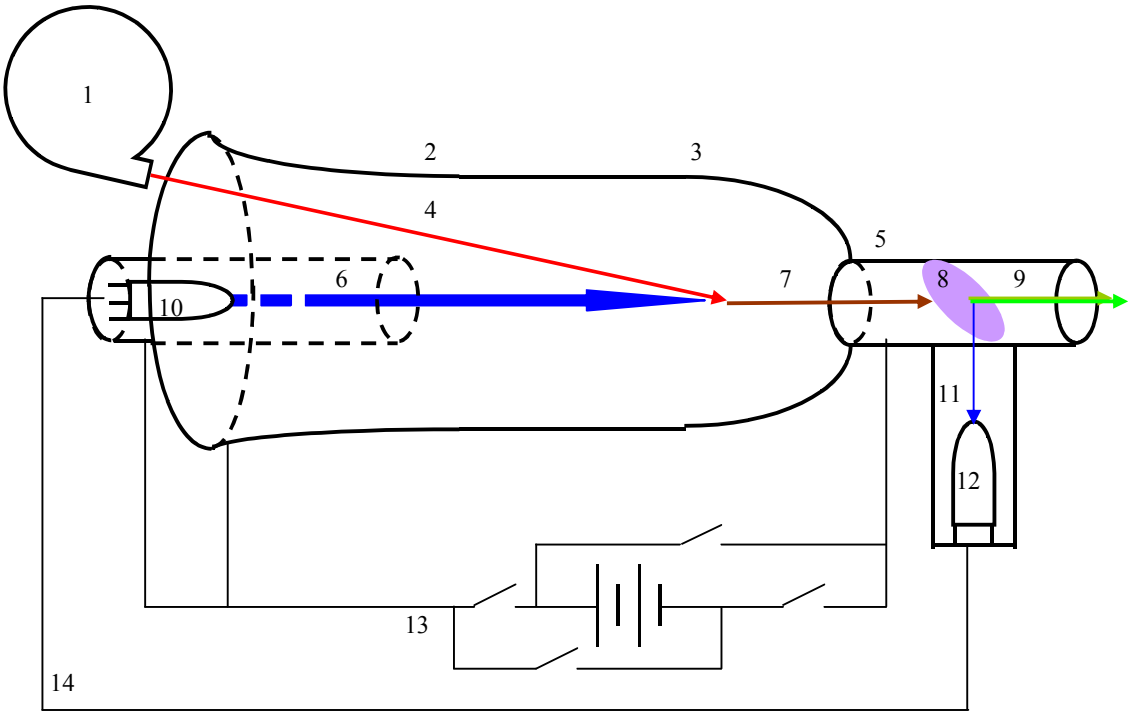


9.7 *Practical applications.*

9.7.1 *Generator of nilmatter or cismatter from antimatter: conceptual plan.*



9.7.2 *Generator of nilmatter or cismatter from antimatter: project plan.*



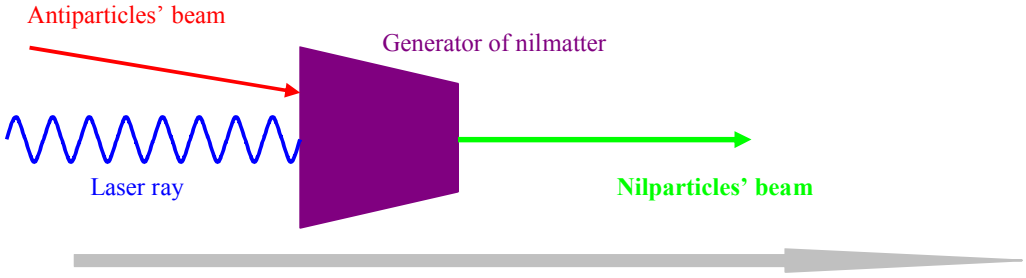
9.7.3 *Generator of nilmatter or cismatter from antimatter: caption.*

1) Antiparticles' generator.
2) Conveyor.
3) Conversion chamber.
4) Antiparticles beam.
5) Nozzle with ionic neutralizzator.
6) Laser ray at adjustable frequency coming in.
7) Beam of nilparticles (or cisparticles), ions and photons.
8) Mirror.
9) Beam of nilmatter or cismatter.
10) Laser diode.
11) Laser ray going out.
12) Photodiode.
13) Switch anode/catode.
14) Feedback photodiode↔laser diode.

9.7.4 *Generator of nilmatter or cismatter from antimatter: explanation.*

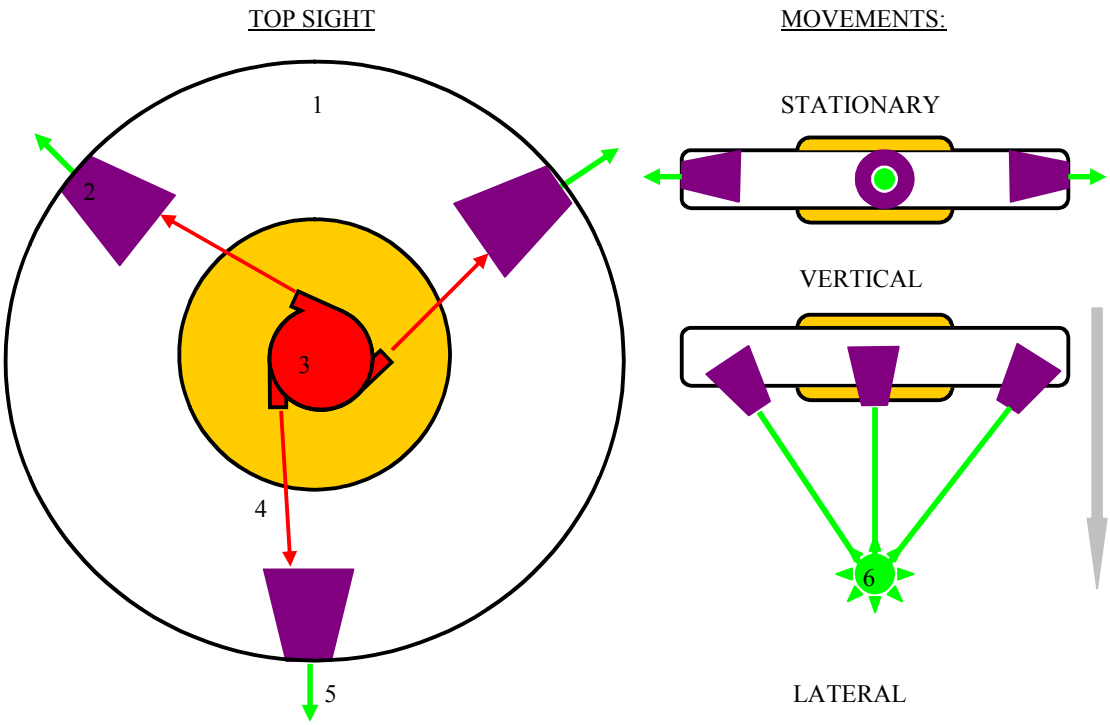
Denote: *h=Plank's constant*, *n=antiparticles' number*, *<m>=average mass*, *ν=laser ray's frequency*.
Cismatter's generation requires a laser ray whose frequency is:
$\nu_{cismatter}=n_{antiparticles}*(<m_{cisparticle}>-<m_{antiparticle}>)*c^2/h$.
Nilmatter's generation requires: $\nu_{nilmatter}=n_{antiparticles}*(m_{nilparticle}-<m_{antiparticle}>)*c^2/h=n_{antiparticles}*|<m_{antiparticle}>|*c^2/h$.

9.7.5 ***Generator of nilparticles' beams used as attractor: conceptual plan.***



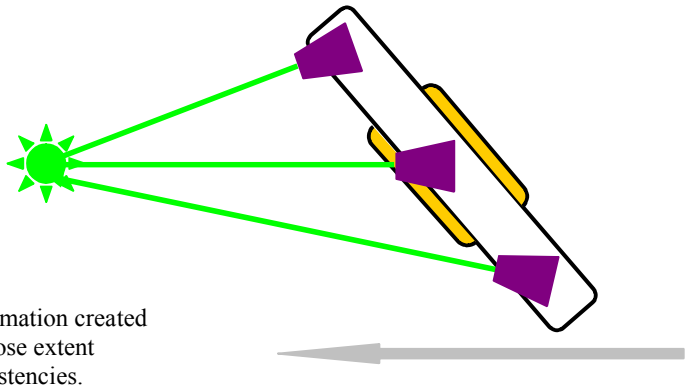
Direction of motion: the same of nilparticles' beam which attracts the generator.

9.7.6 ***Aircraft with generators of nilparticles: project plan.***



9.7.7 ***Nilparticles' aircraft: caption.***

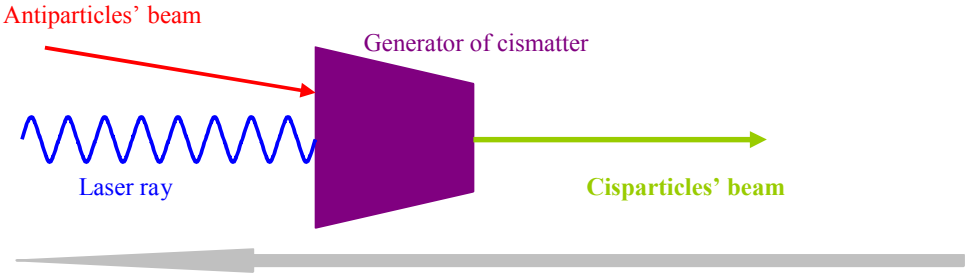
1) Aircraft's frame.
2) Nilmatter's generator.
3) Antimatter's generator.
4) Antiparticles' beam.
5) Nilparticles' beam.
6) Nilparticles' bubble.



9.7.8 ***Nilparticles' aircraft: explanation.***

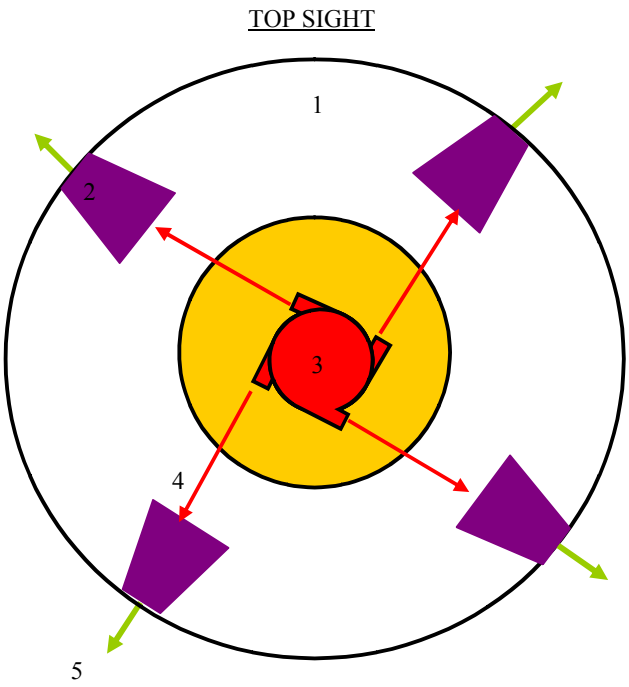
In the place where nilparticles meet the formed nilmatter's bubble attracts the aircraft towards it.
Hence the aircraft runs after a space-time's deformation created by itself, exactly as due to a huge close mass whose extent is adjusted at pleasure according to beams' consistencies.
By orientating beams the velocity's direction is governed as well.

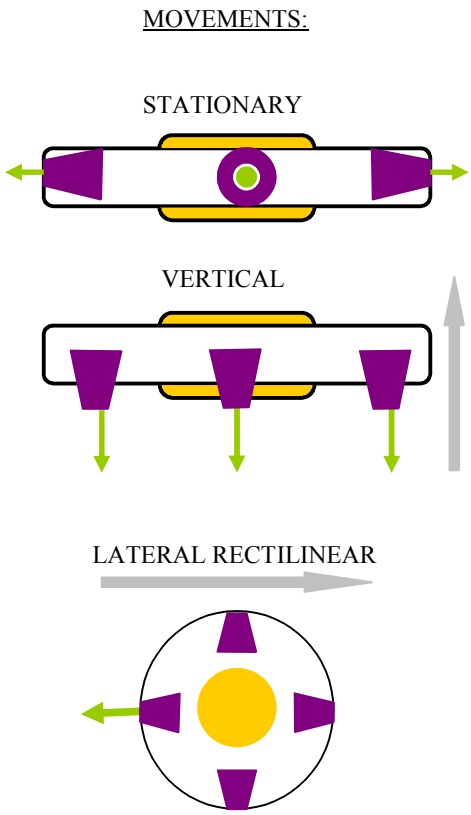
9.7.9 *Generator of cisparticles' beams as propeller: conceptual plan.*



Direction of motion: opposite to cisparticles' beam which pushes the generator backwards.

9.7.10 *Aircraft with generators of cisparticles: project plan.*



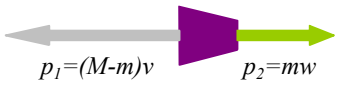


9.7.11 *Cisparticles' aircraft: caption.*

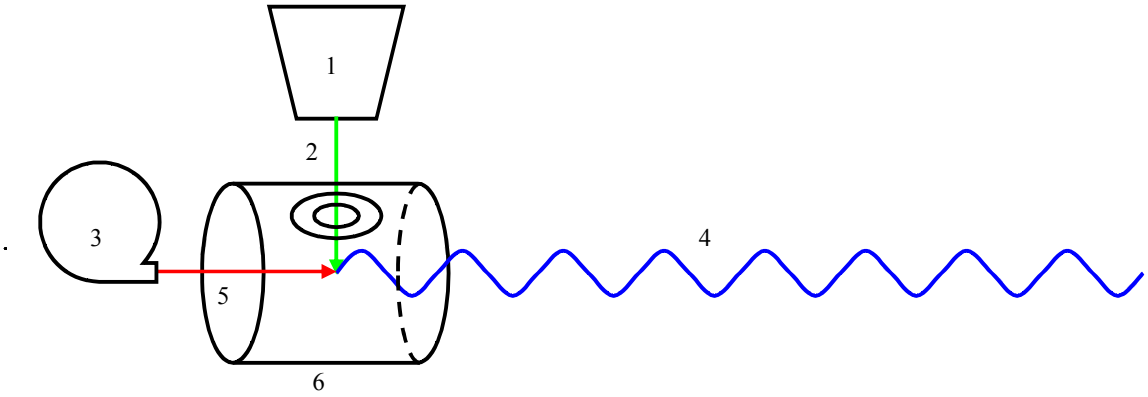
1) Aircraft's frame.
2) Cismatter's generator.
3) Antimatter's generator.
4) Antiparticles' beam.
5) Cisparticles' beam.

9.7.12 *Cisparticles' aircraft: explanation.*

Assuming valid the conservation of *movement quantity* $p_1=p_2$ for a SP oberver, the speed of aircraft v is linked to the aircraft's mass M, to the beam of expelled cismass m and to the same beam's speed w, by equation: $v=mw/(M-m)$.
Since $m<<M$, cismass must have a velocity $w>>v$, *i.e.* the cisparticles'mass should get close to the particles' m_0 at rest.
It requires a laser ray of frequence: $\nu \equiv n_{antiparticles}*(m_0-<m_{antiparticle}>)*c^2/h$.



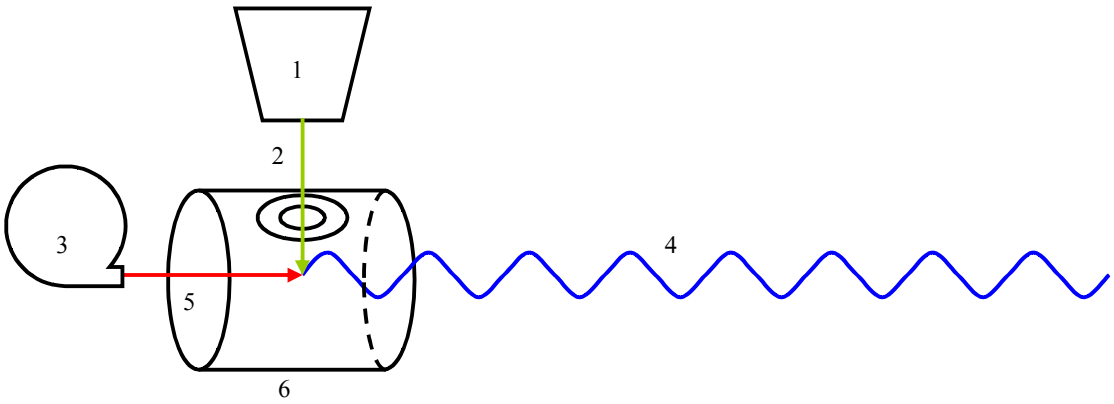
9.7.13 ***Neutralizator of nilmatter: project plan.***



9.7.14 ***Neutralizator of nilmatter: caption.***
1) Nilparticles' generator.
2) Nilparticles' beam coming in.
3) Antiparticles' generator.
4) Photons' beam going out.
5) Antiparticles' beam.
6) Conversion chamber: $\bar{a}+\check{a}\rightarrow\gamma$.

9.7.15 ***Neutralizator of nilmatter: explanation.***
An antiparticles' beam collides with a nilparticles' one according to conversion into photons: $\bar{a}+\check{a}\rightarrow\gamma$.

9.7.16 ***Neutralizator of cismatter: project plan.***



9.7.17 ***Neutralizator of cismatter: caption.***
1) Cisparticles' generator.
2) Cisparticles' beam coming in.
3) Antiparticles' generator.
4) Photons' beam going out.
5) Antiparticles' beam.
6) Conversion chamber: $\bar{a}+\ddot{a}\rightarrow\gamma$.

9.7.18 ***Neutralizator of cismatter: explanation.***
An antiparticles' beam collides with a cisparticles' one according to conversion into photons: $\bar{a}+\ddot{a}\rightarrow\gamma$.

REFERENCES

Aharonov, Y., et al., "Time Symmetry in the Quantum Process of Measurement," *Physical Review* n. 134B (1964), p. 1417

Bilaniuk, O.M., Sudarshan, G., "Particle beyond the light barrier," *Physics Today* n. 22 (1969), p. 43

Bonacci, E., *Special Relativity Extension*, Carta e Penna, 2006

Bonacci, E., "Einstein and Fermat according to Bonacci," *Blumagazine* n. 8 (2006), p. 54

Bonacci, E., "Extension of Einstein's Relativity," Pisa, *93rd IPS Congress* (2007), Atticon3691 I-C-1

Bonacci, E., "Extension of Einstein's Relativity," *Blumagazine Video* (2007), Pisa

Bonacci, E., *Extension of Einsten's Relativity*, Rome, Aracne n. 42, 2007

Bonacci, E., *Beyond Relativity*, Rome, Aracne n. 43, 2007

Bonacci, E., "Beyond Relativity," *Lectio Magistralis*, «L. Da Vinci» Terracina 2008, Auditorium

Bonacci, E., "Praeter Relativitatem," *Lectio Magna*, «G.B. Grassi» Latina 2008, Aula Magna

Dingle, H., *The Special Theory of Relativity*, Methuen, 1940

Eddington, A., *The Mathematical Theory of Relativity*, Cambridge, 1924

Einstein, A., "Uber einen die Erzeugung und Verwandlung des Lichtes betreffenden heuristischen Gesichtspunkt," *Annalen Der Physik*, March 17 1905

Einstein, A., "Zur Elektrodynamik bewegter Körper," *Annalen Der Physik*, June 30 1905

Einstein, A., *The Meaning of Relativity*, Methuen, 1951

Einstein, A., *Relativity*, Routledge Classics, 2001

Feynman, R.P., "The Theory of Positrons," *Physical Review* n. 76 (1949), p. 749

Gold, T., "The Arrow of Time," *American Journal of Physics*, n. 30 (1962), p. 403

Krauss, L.M., *Quintessence: The Mystery of the Missing Mass*, Basic Books, 2001

Kreimer, D., *Knots and Feynman Diagrams*, Cambridge, 2000

Majorana, E., "Teoria simmetrica dell'elettrone e del positrone," *Nuovo Cimento* n. 14 (1937), p. 171

Pauli, W., *Theory of Relativity*, Pergamon, 1958

Schwinger, J., *Quantum Electrodynamics*, Dover, 1958

Sudarshan, G., Dhar, J., "Quantum Field Theory of Interacting Tachyons," *Phys. Rev.* n. 174 (1968), p. 1808

Synge, J.L., *Relativity: The Special Theory*, North Holland, 1956

Von Neumann, J., *Mathematical Foundations of Quantum Mechanics*, Princeton, 1955

Zee, A., *Quantum Field Theory in a Nutshell*, Princeton, 2003