Article

Dark Matter & Dark Energy Are Mirage

Gunn Quznetsov[*]

Abstract

It is known that probabilities of pointlike events are defined by some generalization of Dirac equation. One part of such generalized equation corresponds to the Dirac's leptonic equation, and the other part corresponds to the Dirac's quark equation. The quark part of this equation is invariant under the oscillations of chromatic states. And it turns out that these oscillations bend space-time so that at large distance space expands with acceleration according to Hubble's law. And these oscillations bend space-time so that here appears the discrepancy between quantity of the luminous matter in the space structures and the traditional picture of gravitational interaction of stars in these structures.

Key words: dark matter, dark energy, mirage, Dirac equation, Hubble's law, acceleration, spacetime, bending, luminous matter, gravitation.

Introduction

It is known that Dirac's equation contains four anticommuting complex 4×4 matrices. And this equation is not invariant under electroweak transformations. But it turns out that there is another such matrix anticommuting with all these four matrices. If additional mass term with this matrix will be added to Dirac's equation then the resulting equation shall be invariant under these transformations [1]. I call these five of anticommuting complex 4× 4 matrices *Clifford pentade*. There exist only six Clifford pentads [2, 3]. I call one of them the light pentad, three — the chromatic pentads, and two — the gustatory pentades.

The light pentade contains three matrices corresponding to the coordinates of 3-dimensional space, and two matrices relevant to mass terms — one for the lepton and one for the neutrino of this lepton. Each chromatic pentade also contains three matrices corresponding to three coordinates and two mass matrices — one for top quark and another— for bottom quark. Each gustatory pentade contains one coordinate matrix and two pairs of mass matrices [4]— these pentades are not needed yet.

It is proven [5] that probabilities of pointlike events are defined by some generalization of Dirac's equation with additional gauge members. This generalization is the sum of products of the coordinate matrices of the light pentade and covariant derivatives of the corresponding coordinates plus product of all the eight mass matrices (two of light and six of chromatic) and the corresponding mass numbers.

If lepton's and neutrino mass terms do not enter in this equation then we obtain the Dirac's equation with gauge members similar to eight gluon's fields [3]. And oscillations of chromatic states of this equation bend space-time.

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Dark Energy

In 1998 observations of Type Ia supernovae suggested that the expansion of the universe is accelerating [6]. In the past few years, these observations have been corroborated by several independent sources [7]. This expansion is defined by the Hubble rule [8]

$V(r) = Hr$

where $V(r)$ is the velocity of expansion on the distance r, H is the Hubble's constant ($H \approx 2.3\times10^{-18}c^{-1}$ [9]).

Some oscillations of chromatic states bend space-time as follows [3]:

$$\frac{\partial t}{\partial t'} = \cosh 2\sigma, \qquad \frac{\partial x_1}{\partial t'} = c \sinh 2\sigma. \tag{1}$$

Hence, if v is the velocity of a coordinate system $<t',x_1'>$ in the coordinate system $<t,x_1>$ then

$$\sinh 2\sigma = \frac{\left(\frac{v}{c}\right)}{\sqrt{1-\left(\frac{v}{c}\right)^2}}, \qquad \cosh 2\sigma = \frac{1}{\sqrt{1-\left(\frac{v}{c}\right)^2}}. \tag{2}$$

Therefore,

$$v = c \tanh(2\sigma), \tag{3}$$

$$v = c \tanh 2\sigma,$$

Let

$$2\sigma := \varpi(x_1)\frac{t}{x_1} \; with \; \varpi(x_1) := \frac{\lambda}{|x_1|} \tag{4}$$

where λ is a real constant with positive numerical value.

In accordanse with formulas (3), (4):

$$v(t,x_1) = c \tanh \frac{\lambda t}{x_1^2}. \tag{5}$$

Fig. 1 shows the dependency of the system $<t',x_1'>$ velocity $v(t; x_1)$ on x_1 in system

Let a black hole be placed in a point O (Fig. 1). Then a tremendous number of quarks states oscillate in this point. These oscillations bend time-space and if t has some fixed volume, $x_1 > 0$, and $\Lambda := \lambda t$ then:

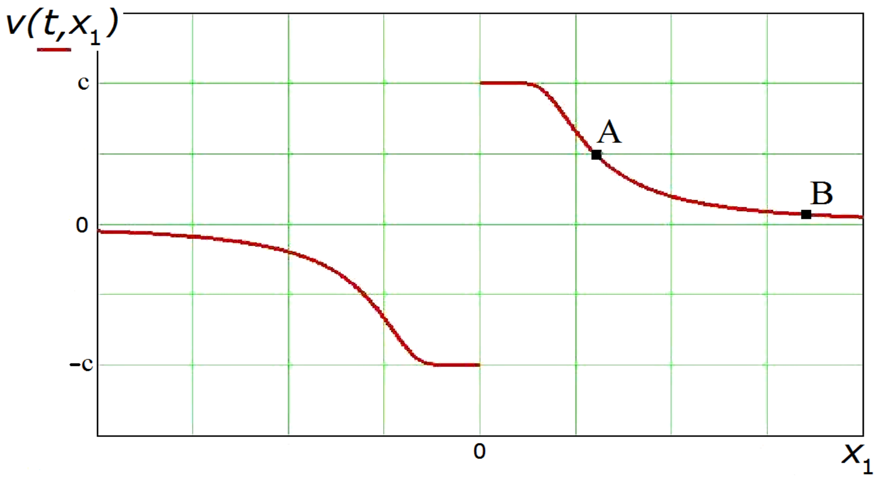

Fig. 1.

$$v(x_1) = c\tanh\frac{\Lambda}{x_1^2}. \qquad (6)$$

A dependency of $v(x_1)$ (light years/c.) on x_1 (light years) with Λ = 741:907 is shown in Fig. 2.

Let a placed in a point A observer be stationary in the coordinate system $<t,x_1>$. Hence, in the coordinate system $<t',x_1'>$ this observer is flying to the left to the point O with velocity $-v(x_A)$. And point X is flying to the left to the point O with velocity $-v(x_1)$.

Consequently, the observer A sees that the point X flies away from him to the right with velocity

$$V_A(x_1) := c\tanh\left(\frac{\Lambda}{x_A^2} - \frac{\Lambda}{x_1^2}\right)$$

in accordance with the relativistic rule of addition of velocities.

Let $r := x_1 - x_A$ (i.e. r is a distance from A to X), and

$$V_A(r) := c\tanh\left(\frac{\Lambda}{x_A^2} - \frac{\Lambda}{(x_A^2 + r)}\right).$$

In that case Fig. 3 demonstrates the dependence of $V_A(r)$ on r with $x_A = 25\times10^3$ l.y. This picture shows that X runs from A with almost constant acceleration H.

Therefore, the phenomenon of the accelerated expansion of Universe is the result of the curvature of space-time that arises because the chromatic states oscillate.

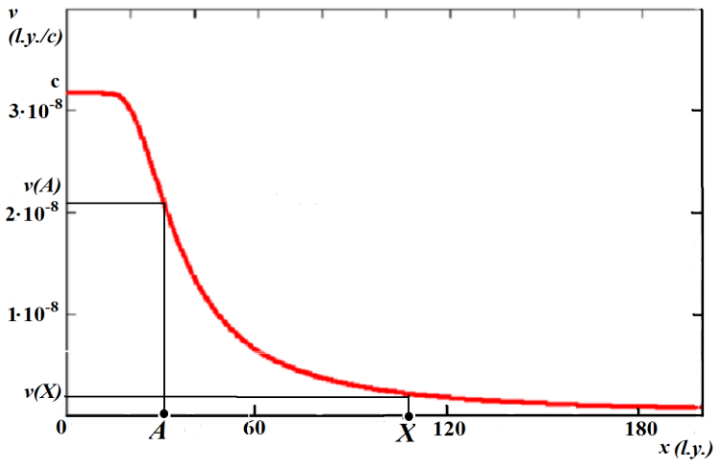

Fig. 2.

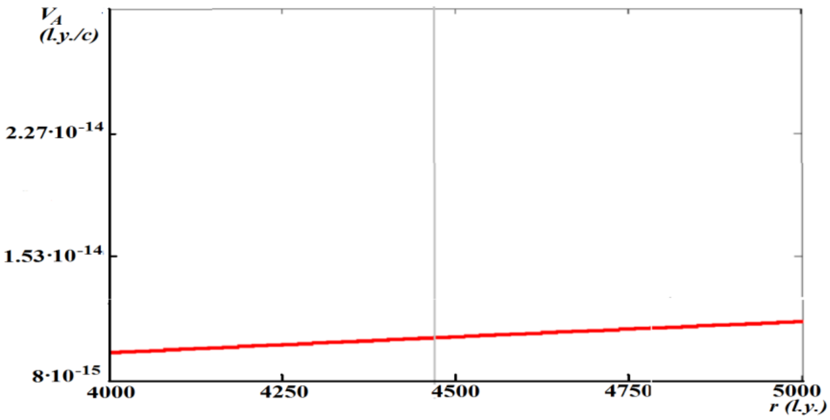

Fig. 3.

Dark Matter

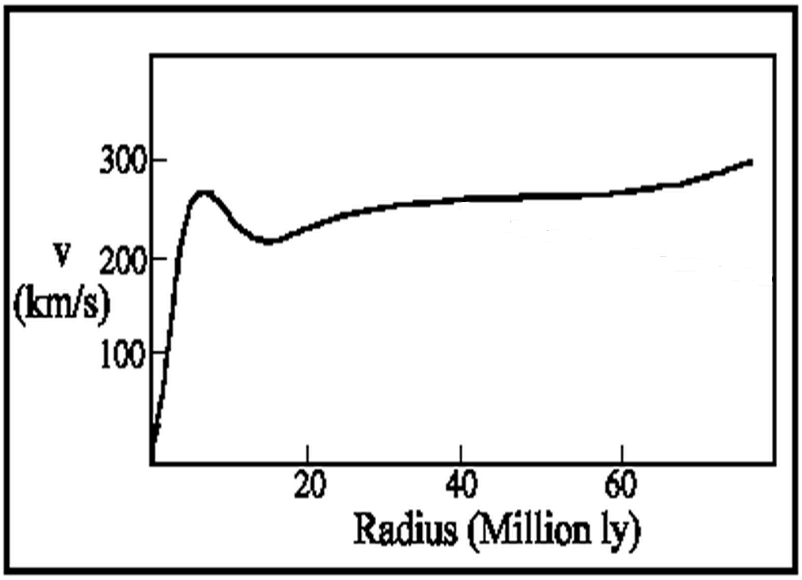

Fig. 4. *A rotation curve for a typical spiral galaxy. The solid line shows actual measurements (Hawley and Holcomb., 1998, p. 390)* [11].

In 1933, the astronomer Fritz Zwicky was studying the motions of distant galaxies. Zwicky estimated the total mass of a group of galaxies by measuring their brightness. When he used a different method to compute the mass of the same cluster of galaxies, he came up with a number that was 400 times his original estimate (1). This discrepancy in the observed and computed masses is now known as "the missing mass problem." Nobody did much with Zwicky's finding until the 1970's, when scientists began to realize that only large amounts of hidden mass could explain many of their observations (2). Scientists also realize that the existence of some unseen mass would also support theories regarding the structure of the universe (3). Today, scientists are searching for the mysterious dark matter not only to explain the gravitational motions of galaxies, but also to validate current theories about the origin and the fate of the universe» [10] (Fig. 4 [11], Fig. 5 [12]).

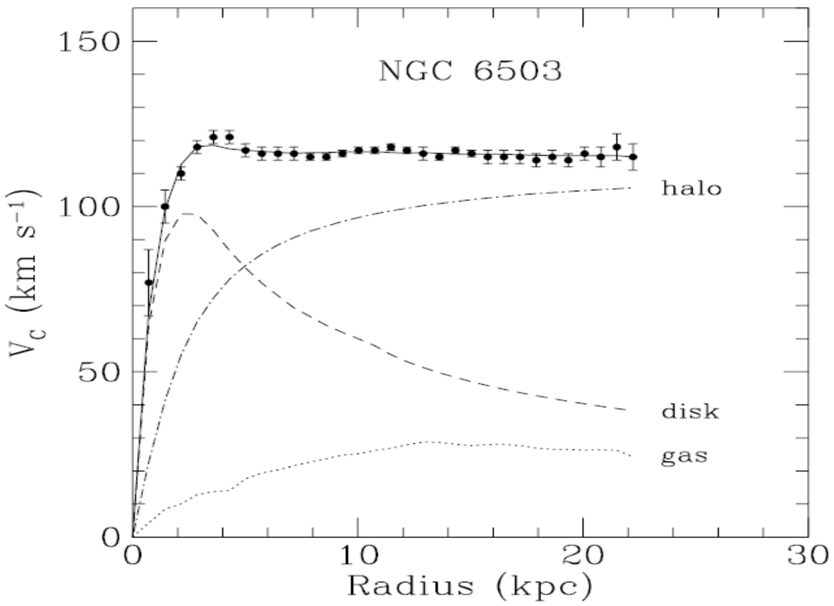

Fig. 5: Rotation curve of NGC 6503. The dotted, dashed and dash-dotted lines are the contributions of gas, disk and dark matter, respectively etc.

And some other oscillations of chromatic states bend space-time as follows [3]:

$$\frac{\partial}{\partial x'} := (\cos(2\alpha))\frac{\partial}{\partial x} - (\sin(2\alpha))\frac{\partial}{\partial y} \ , \qquad (7)$$

$$\frac{\partial}{\partial y'} := (\cos(2\alpha))\frac{\partial}{\partial y} + (\sin(2\alpha))\frac{\partial}{\partial x} \ . \qquad (7a)$$

Let

$z := x + \mathrm{i}y$, $i.e.\, z = re^{\mathrm{i}\theta}$,

$z' := x' + \mathrm{i}y'$.

Because linear velocity of the curved coordinate system $\langle x', y' \rangle$ into the initial system $\langle x, y \rangle$ is the following[†]:

$$v(\theta, r) = \sqrt{\left(\dot{x}'(\theta, r)\right)^2 + \left(\dot{y}'(\theta, r)\right)^2}$$

then in this case

$$v(\theta, r) = \left|\dot{z}'\right|. \tag{8}$$

Let function z' be a holomorphic function. Hence, in accordance with the Cauchy-Riemann conditions the following equations are fulfilled:

$$\frac{\partial x'}{\partial x} = \frac{\partial y'}{\partial y},$$
$$\frac{\partial x'}{\partial y} = -\frac{\partial y'}{\partial x}.$$

Therefore, in accordance with (7) and (7a):

$$dz' = e^{-\mathrm{i}(2\alpha)} dz$$

where 2α is an holomorphic function, too.

For example, let

$$2\alpha := \frac{\mathrm{i}}{t}\left((x + y) + \mathrm{i}(y - x)\right).$$

In this case:

$$\dot{z}' = -\frac{1}{16}(1 - \mathrm{i})[A(t, r, \theta) + B(t, r, \theta) + C(t, r, \theta)]$$

where

$$A(t, r, \theta) := \frac{4r\cos\theta}{\sqrt{t}} e^{\frac{2r^2}{t}(\sin 2\theta - \mathrm{i}\cos 2\theta)},$$

$$B(t, r, \theta) := -\frac{2\sqrt{\pi}}{\sqrt{t}} \operatorname{erf}\left(Q(\theta)\frac{r}{\sqrt{t}}\right),$$

[†] $\dot{x}' := \frac{\partial x'}{\partial t}, \dot{y}' := \frac{\partial y'}{\partial t}$.

$$C(t,r,\theta) := -\sqrt{\pi}(\cos\theta)\,Q^*(\theta)\operatorname{erf}\left(Q(\theta)\frac{r}{\sqrt{t}}\right)$$

where

$$Q(\theta) := (\cos\theta - \sin\theta) + \mathrm{i}(\cos\theta + \sin\theta)\,.$$

Under large t:

$$\dot{z}' \approx := -\sqrt{\pi}(\cos\theta)\,Q^*(\theta)\operatorname{erf}\left(Q(\theta)\frac{r}{\sqrt{t}}\right).$$

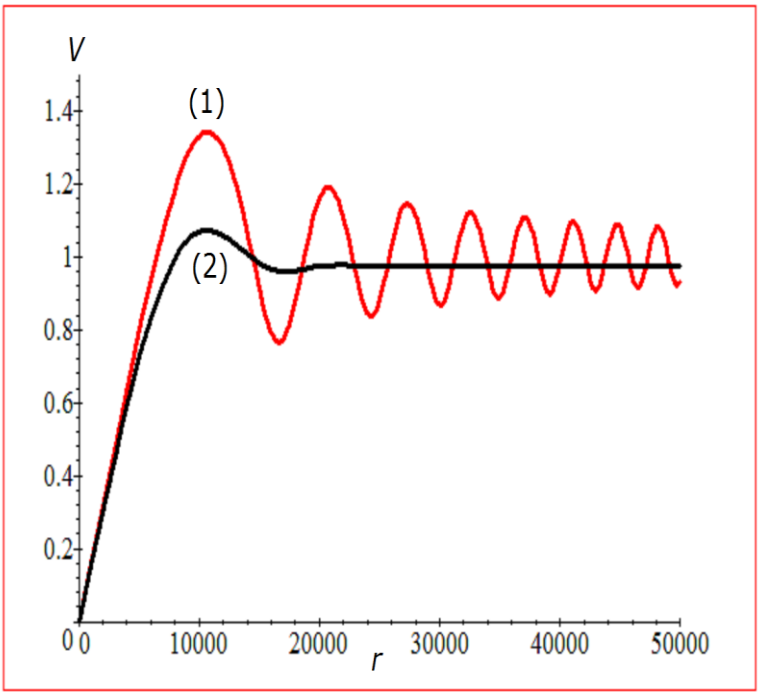

Fig.6

Fig.6 shows the dependence of velocity V on the radius r at large $t \sim 10^{+8}$ and line (1) at $\theta = \pi$, and line (2) at $\theta = 13\pi/14$. Compare it with Fig. 4 and Fig.5.

Conclusion

Hence, Dark Matter and Dark Energy can be mirages in space-time, which is curved by oscillations of chromatic states.

Then what about Big Bang?

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