Title :THERMAL TRANSFER AND FLUID MECHANICS IN THE THEORY OF ETHER
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Abstract:

In a previous article (1), we presented a very complete cosmological theory of ether. In this article we bring complements to this cosmology. In particular we study fluid mechanics for a spherical concentration of ether-substance moving inside the intergalactic ether-substance. We make also appear 2 kinds of radius for a galaxy and we establish the evolution as a function of time of the 1st kind. We also verify a simple relation between the 2 radius of the milky way at an age of the universe equal to 5 billion years. We also study the thermal transfer linked to the motion of a galaxy inside the intergalactic ether-substance (ether-substance occupying the space between galaxies) .

1.INTRODUCTION

In a previous article (1), we exposed a very general Cosmological theory of ether. In this article, we saw that a (spiral) galaxy could be modeled as a spherical concentration of ether-substance moving inside the space. A priori we could expect that a consequence of the motion of such a concentration of ether-substance inside the intergalactic ether-substance should lead to a change of mass and of velocity of this concentration. We are going to study this phenomenon in the present article. Moreover we will see that we can define 2 different kinds of radius for a galaxy, the 1st one being the radius of the spherical concentration of ether-substance, called "ethered radius" of the galaxy. We are going to study the evolution as a function of time of this ethered radius, and we will verify a very simple relation that must exist between the 2 radius in the case of the milky way. Also we will see that the thermal model used to obtain the Tully-Fisher's law must be modified if we want to take into account the motion of the galaxy, but that with a simple approximation our thermal model remains valid. We remind that this Cosmological theory of ether is a part of a very general theory of ether, exposed in the references (2)(3) and in articles published by the same author in the review Physics Essays. Nonetheless, the Cosmological theory of ether exposed in the article (1) and in the present article can be understood and stands by itself.

2.MOTION OF A GALAXY INSIDE THE INTERGALACTIC ETHER-SUBSTANCE

We could think that a spherical concentration of ether-substance such as a galaxy (or close to a star) moving inside the intergalactic ether-substance should be braked or be modified in mass because of the ether-substance surrounding this concentration.

In fact, we have 2 phenomena that we are going to justify further:

A.The moving spherical concentration of ether-substance keeps its mass.

B.The moving spherical concentration of ether-substance keeps its velocity: It is not braked nor accelerated;

Indeed, let us consider a spherical concentration of ether-substance (center O) driven with a velocity **V** inside the intergalactic ether-substance. Let us consider S, surface of a disk of the sphere having its center in O, the plane of the disc being perpendicular to **V**.

Then in an interval of time dt, we have the 2 phenomena:

C.A volume SVdt of ether-substance is absorbed by the spherical concentration.(In front of the sphere).

D.A volume SVdt is emitted by the spherical concentration (to the back of the sphere).
Moreover we remark that the emitted and the absorbed volume have the same velocity and the same density.
Then the points A and B appear to be consequences of the points C and D and of the last remark.

3.BARYONIC AND ETHERED RADIUS OF A GALAXY

We know that the galaxy Andromeda is approximately at 2.5 billions year-light of our galaxy the milky way. We consider for instance the case of the milky way in order to present the 2 kinds of radius of a galaxy.
We remind that we considered if r is the distance to the center O of a galaxy, that the expression of the density of ether-substance $\rho(r)$ is, k_3 being a constant:

$$\rho(r) = \frac{k_3}{r^2} \qquad (1)$$

So we obtain, M being the mass of the sphere having its center in O and a radius r:

$$M(r)=4\pi k_3 r \qquad (2)$$

Consequently, v being the velocity of a star at a distance r of O:

$$v^2 = \frac{GM}{r} = 4\pi k_3 G \qquad (3)$$

Consequently:

$$k_3 = \frac{v^2}{4\pi G} \qquad (4)$$

We know also that if ρ_0 is the density of the intergalactic ether-substance, then the radius R of the concentration of ether-substance constituting the galaxy is given by the expression:

$$\rho(R) = \frac{k_3}{R^2} = \rho_0 \qquad (5)$$

Consequently:

$$R = \sqrt{\frac{k_3}{\rho_0}} = v\sqrt{\frac{1}{4\pi G}} \qquad (6)$$

We will call R the “ethered radius” of the considered galaxy.

Let $\rho_0(5)$ be the density of the intergalactic medium when the age of the universe was 5 billion years, and $\rho_0(15)$ at an age of 15 billion years (presently).
We know that if f is the factor of expansion of the universe between 5 and 15 billion years (we know that f=3, see the article [(1)]:

$$\rho_0(15)=\rho_0(5)/f3 \qquad (7)$$

So in a (spiral) galaxy we have 2 different kinds of radius:
The 1st kind of radius, called “ethered radius”, is the radius of the concentration of ether-substance. The 2nd kind of radius is the radius of the disc containing all the stars. We will call “baryonic radius” this second kind of radius. We remark that at a given time, the ethered radius must be greater than the baryonic radius.
We can define $r_B(15)$ as the present baryonic radius of the milky way. We know that $r_B(15)$ is approximately equal to 50000 years light . If R(15) is the present ethered radius of the milky

way, we could assume that R(15) is approximately 10 times greater than $r_B(15)$ (approximately 500000 years light):

$R(15)=10r_B(15)$ (8)

Of course we ignore the real value of R(15), bur our hypothesis gives a possible acceptable value.

Let $r_B(5)$ be the baryonic radius of the milky way when the age of the Universe was 5 billion years. Considering that the baryonic radius increases with time, we have the relation:

$r_B(15)\geq r_B(5)$ (9)

Moreover, using the equation (7), we obtain:

$R(5)=R(15)/5=2r_B(15)$ (10)

Using the equation (9) and (10) we obtain that at an age of the Universe of 5 billion years, the ethered radius was greater than the baryonic radius:

$r_B(5)\leq R(5)$ (11)

We remark that the previous relation would remain true for a galaxy with the same ethered radius but with a baryonic radius twice greater than the radius of the milky way. (We just take $r'_B(15)$ equal to 100000 years light and replace the equation (8) by the equation: $R'(15)=5r'_B(15)$). Our model is valid if we consider that the definitive ethered radius is reached when the Universe was 5 billion year old, or later.

4.THERMAL TRANSFER TO A MOVING GALAXY

We remark that the phenomena of absorption and of emission of ether-substance by a galaxy that we described in the Chapter 2 modifies the thermal equilibrium that we used in the article [(1)] in order to obtain the Tully-Fisher's law.

We remark that we can consider that the absorption and the emission of ether-substance by a galaxy leads to a thermal transfer defined by a power $\varepsilon(t)$ dissipated by the galaxy. (Obviously, $\varepsilon(t)$ depends on the ethered radius of the moving galaxy, its velocity and the density of the intergalactic ether-substance).

If we make the approximation that $\varepsilon(t)$ is negligible compared with the power emitted by the baryons of a galaxy towards the ether-substance, than we can keep the thermal model used to obtain the Tully-Fisher's law.

5.CONCENTRATION OF ETHER-SUBSTANCE AROUND STARS AND PLANETS

It is logical to assume that because of gravitation, a concentration of ether-substance occurs around planets and stars.

Let us for instance consider the sun with a mass M. The equation of equilibrium is, for an element of ether-substance with a density $\rho(r)$, a width dr, a surface dS situated at a distance r from O the center of the sun, P(r) being the pressure at this distance of O:

$$P(r+dr)dS-P(r)dS+\frac{GM\rho(r)drdS}{r^2}=0 \qquad (12)$$

We remind [1] that we have $P(r)=k_1\rho(r)$ with $k_1=k_0T$, T temperature of the concentration of ether-substance.
So we obtain, solving easily the previous differential equation:

$$\rho(r) = K\exp(\frac{GM}{k_1 r}) \qquad (13)$$

It is logical to assume that if ρ_0 is the density of the ether-substance surrounding the concentration of ether-substance linked to the sun, $K=\rho_0$. So we have:

$$\rho(r) = \rho_0\exp(\frac{GM}{k_1 r}) \qquad (14)$$

We want now to obtain the radius of the concentration of ether-substance linked to the sun.Let R be this radius. It is logical to assume, as we did for a galaxy in the article [1], that $\rho(R)$ is very close to ρ_0. For instance we have $\rho_0\leq\rho(R)\leq\rho_0(1+\varepsilon_0)$. We obtain immediately that this condition is equivalent, approximately to:

$$\frac{GM}{k_1 R} = \varepsilon \qquad (15)$$

With $0\leq\varepsilon\leq\varepsilon_0$.
So we obtain:

$$R = \frac{GM}{k_1\varepsilon} \qquad (16)$$

The thermal equation of equilibrium between the concentration of ether-substance linked to the sun (Temperature T) and the surrounding ether-substance (Temperature T_0), is,using the convective thermal transfer that we used in the article [1]:

$$4\pi R^2 h(T-T_0)=KM \qquad (17)$$

We remind [1] that $h(T-T_0)$ is the expression of the convective flow and KM is the power emitted by the baryons towards the ether-substance.
With the approximation $T_0<<T$ we obtain:

$$4\pi\frac{G^2M^2}{k_1^2\varepsilon^2}hT = KM \qquad (18)$$

$$T = \frac{4\pi G^2 Mh}{K\varepsilon^2 k_0^2} \qquad (19)$$

$$R = \frac{GM}{k_0 T\varepsilon} = \frac{K\varepsilon k_0}{4\pi Gh} \qquad (20)$$

So we have the remarkable result that R is independent of M. We have also the conditions $R\geq r_0$, r_0 radius of the sun and $0\leq\varepsilon\leq\varepsilon_0$.
It is natural to assume that the radius of the concentration of ether-substance linked to the sun is the minimal possible radius. So we obtain the remarkable result:

$$R=r_0 \qquad (21)$$

We remind that in Chapter 4 we saw that some energy was dissipated because of the absorption and emission of some ether-substance linked to the sun due to its motion. Again, if $\varepsilon(v,T,R,\rho_0)$ is the dissipated power, we can make the assumption: $\varepsilon(v,T,R,\rho_0)<<KM$. But we remark that even if we have not this relation, the energy dissipated by the concentration of ether-substance linked to the sum is completely received by the surrounding ether-substance. Consequently the net emitted power remains KM.

It is important to realize that the temperature of the ether-substance linked to the sun can be very great. Indeed we know that the density of the ether-substance linked to the sun is approximately $10^{-21}kg/m^3$ density of our galaxy), and the density of the sun is approximately equal to 1000 kg/m^3. Consequently the ratio of those densities is 10^{-24}. Then we see that if the baryons lose 10^{-10} degrees in one second (which corresponds to 3.10^{-3} degrees per year) then the elevation of temperature communicated to the ether-substance linked to the sun is, supposing that the ether-substance has the same calorific capacity as ordinary matter (per kg), 10^{14} degrees, or equivalently 1 hundred thousands billions of degrees per second. If the calorific capacity of ether-substance is one thousand less than capacity of ordinary matter, the communicated temperature increases from the same factor.

We remind that in our article [(1)], we made the hypothesis that the baryons transmitted some energy to the ether-substance surrounding them only if their temperature was superior. This is not possible: We make in fact the hypothesis that baryons transmit heat to ether-substance even if their temperature is inferior. We can justify this by the following argument: We can admit that a baryon vibrates if it is at any temperature (The more it vibrates the higher is its temperature). Then the ether-substance surrounding the baryon brakes this vibration and consequently baryons communicate, whatever be their temperature, an energy to this ether-substance that is converted in thermal energy.

6.TEMPERATURE OF THE INTERGALACTIC ETHER-SUBSTANCE

In our article [(1)], we made the hypothesis that it existed a convective transfer from the Universe (constituted of ether-substance) towards the “nothingness” surrounding it. So the flow F emitted by the universe can be expressed as the expression $F=hT$, T temperature of the intergalactic ether-substance. It is easy to verify that if we took the constant h used for the transmission of heat from ether-substance towards ether-substance (For instance equation (17)), then we would obtain a very high temperature of the intergalactic ether-substance. So in fact we think that h, used for thermal transfer between the intergalactic ether towards the “nothingness” is infinite. Then we obtain a temperature of the intergalactic ether-substance equal to 0 or very close to 0, at any age of the Universe.

7.CONCLUSION

So we obtained the very interesting result that the motion of a spherical concentration of ether in the intergalactic space does not alter its mass nor its velocity. Moreover we defined 2 different radius for a galaxy, the ethered radius and the baryonic radius. We verified in the case of the milky way that the ethered radius must be greater that the baryonic radius at a given age of the Universe. We also established the evolution as a function of time of the ethered radius. We also made an important approximation in the thermal model permitting to obtain the Tully-Fisher’s law.

References:

1.Thierry Delort, Ether, dark matter and topology of the Universe, open archives Vixra, Internet archives (2013).

2.Thierry Delort, Théories d'or 5e edition, Editions Books on demand, Paris (2013)
3.Thierry Delort, Theory of ether, Physics Essays 13,4 (2000)
4.D.J Raine,E.G Thomas, An introduction to the science of Cosmology, Institute of Physics, London (2001)
5.J.V Narlikar, An introduction to Cosmology, Cambridge University press, Cambridge (2002)