<p style="text-align:center">Part XX</p>

'Dark Matter' Mysteries

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Contents

Introduction

Today, the usual scientific attitude as to the nature of the Dark Matter, which accounts for about 27% of the total cosmos, is that, apart from the fact that it gravitates, we know next to nothing as to its nature. In these notes we shall present some tentative answers.

Our approach to this problem , and to all cosmology, is via compressible flow physics. (Ref.1 – 11) This is why we invoke equations of state – a compressibility concept – to explain the major cosmic entities. We use a.linear, centred equation of state for the **Dark energy (p = ± v**), a

simple linear equation i.e.the hyperbolic state for our ordinary, compessed, **visible matter** world (pv = RT) ; an elliptical state for the rarefied, invisible world of **Dark Matter, (** $(p^2/b^2 + v^2/a^2 = a^2 b^2)$, and **<u>linear equations</u>** $(p = \pm Av + C)$ for the simple wave function of quamtum waves, graviton waves, etc.($p = \pm v$).

Returning to the dark matter, there is evidence of the presence of microwaves , (MW) , being widespread in the cosmos. For example our Milky Way is composed apparently of 90% dark matter, and it is permeated with a "mist" of Microwave radiation.

Now microwave radiation has the strength of visible matter's low kinrtic energy. Let us examine therefor the possibility that a **<u>transformation of visible matter into dark matter is going on with a release of its low kinetic energy(MW) as the visible matter is transformed into dark matter and disappears from sight.</u>** Thus, the presence of free microwave energy in the cosmos could be a clue that a transformation from visible matter to dark matter has gone on or is going on.

The physics behind this behaviour is related to the curvature of the equation of state on the pv diagram. (Table 1.) If $d^2 p/dv^2$ is greater than zero, that is if the curvature is positive , as with the hyperbolic state, then waves grow with time, compression shocks form and visible matter condenses, as in the Big Bang. On the contrary, if the curvature is negative, that is, if the state equation has negative curvature as with the elliptical state, then the matter is rarefied or expansive and dark matter forms in the rarefaction that immediately followed the Big Bang. (Ref 4 -5)

If the state equations are straight , i.e linear, then finite waves of low amplitude propagte through space unchanged in amplitude. Shocks are impossible and only radiation waves or radiarion quanta or gravitational force waves of quanta are possible.These linear states have no matter, only radiation or force waves, i.e. radiation or force quanta.

Table 1

Curvature   (d^2p/dv^2)   Criteria for Determining Wave Type

a) Compression waves steepen to shocks and   expansion (rarefaction) waves flatten and die out

when $d^2p/dv^2 > 0$ i.e when the equation of state **is <u>hyperbolic</u>** (convex upwards) Ideal Gas Law

Visible matter state [pv = RT]

b) Rarefaction waves steepen to shocks and compression waves flatter and die out

when $d^2p/dv^2 < 0$ **i.e.** when the state equation is <u>elliptical</u> **(concave inwards).**

Dark (elliptical) matter state   ($p^2/b^2 + v^2 /a^2 = a^2$ b)

c) Linear waves of both compression(E/M) and 'dark radiation' are stable and shocks die out

when $d^2p/dv^2 = 0$ i.e. when the state equation is linear (straight line)

Linear radiation states (p = Av ±B   Both E/M radiation and 'dark radiation

Let us now show how the well known Big Bang fits into all this. The Big Bang arises from a super strong compression shock in the hyprbolic state which formed our compressed world of visible matter.

Immediately following the Big Bang's super strength compression shock in which the condensed matter of the visible cosmos was formed, there occurred a super inflation or re-expansion .Now the equation of state for expansion or rarefaction action, namely the elliptical or rarefaction state , was formed into a super rarefaction or expansion shock wave state and we propose that this brought

about the formation of the bulk of the 27% of the cosmos that is ascribed to dark matter. Thus we are proposing that the dark matter is a rarefied or expansion form of matter with an elliptical equation of state.

Now the dark matter might also form <u>locally and sporadically</u> from visible matter by a local transformation in which the low molecular evergy microwaves are released , and the compressed energy visible matter expands to form the rarefied or dark matter. This transformation has occurred immediately after the compression of the Big Bang and <u>possibly</u> locally since then.
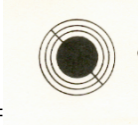
If the visible matter is involved in this expansionary transformation, then it's low kinetic energy is releaased in the transformation process accounting for the presence of microwaves in the cosmos.

A Solution to the 'Vacuum Catastrophe' Problem in Quantum Physics

Dark energy , assigned equation of state for gravitation and the various quantum $p = \pm v$) , is not a cosmological, directly detectible entity; instead, it arose from a need to explain the observed expansion rates of the visible Hubble universe. We now assign this dark energy field as forming the basic quantum wave function field and also the gravitational wave function field. Its quantum waves are rarefaction in nature. With this assignment we are able to solve various problems in quantum physics.

First, it seems to easily resolve one of the more startling problems in physics, namely the '**vacuum catastrophe' or the 'cosmological constant problem'** which refers to the huge difference or conflict between the calculated value of the quantum vacuum energy at around 10^{60} while the observed vacuum energy value seems to be around zero!

This conflict, however, **vanishes with our assignment of the dark energy to the rarefaction waves capability   of the linear, centered equation, since rarefaction entities or forms, just like the rarefied 'dark matter' forms, will simply not be visible or observable by us from our standpoint in our visible, compressed matter universe.**   Since quantum rarefied forms then are 'dark' or invisible, the huge vacuum energy value can be there, but it is just not observable, and so the problem vanishes.

With the repeated emergence of experimental proofs of the violation of Bell's *Inequality by Aspect et al , a* solution to the theoretical implications for quantum mechanics has become more urgent. Apparently q**uantum physics has become definitely non-local, entanglement is a reality, information exchange and signaling is quasi-instantaneous etc, etc**.

` Towards a solution to these problems, we note that both the quantum wave functions and the gravitons are now placed in the same state or field. Therefore, a gravitational -quantum interaction of some sort may arise. For example, we note that the ratio of the Gravitational constant G and Planck's constant G/h has the dimensions of velocity or speed.

. Inserting the numerical values for G and h in this ratio,

$$c_Q = G/h = 6.67 \times 10^{-11} / 6.63 \times 10^{-34} = 10^{23} \text{ m/s}$$. So we **have a possible quantum phase wave speed** c_o

This enormous phase wave speed would make the collapse of the wave function effectively instantaneous and thereby eliminate several problems at once. to wit, the vacuum energy problem and the instantaneous entanglement/collapse of the wave function problem
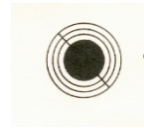
First, the vacuum energy density actually is just as calculated by quantum physics, but its particles are rarefaction units which are not detectible or measurable, just as dark matter is not detectable by visible compression methods or instruments. In addition, we have $c_\Psi^2 + c_o^2 = 10^{46} + 10^{16} = 10^{62}$ which is about the usual **calculated value for the quantum vacuum energy** . And so, the quantum calculations are actually correct but are just not observable from our visible cosmos. standpoint.

Second, with regards to **the problem of the instantaneous collapse of the wave function in quantum measurements**, the same enormous wave velocity c = 10^{23} m/s provides a solution, since, when a measurement is made on a system, the signal and the collapse both travel quasi-instantaneously as required by quantum theory. We assign the rarefaction wave functions to the dark energy and quantum phenomena with the enormous said wave speed, while the compression waves

which travel at the speed of light $(3x10^8$ m/s) are allotted to the graviton. Thus general relativity is retained to account for gravitational force and motions.

The two above examples, of solutions to current quantum problems by the proposed universal field ($p = \pm v$) are striking of course. But, we point out that whether or not they fit in completely with the rest of quantum theory is a matter for specialists. If they are found to fit, then attention can turn to additional further questions.

The choice for matter, i.e between compression and rarefaction , can be made from the curvature of the respective state equations. Hyperbolic i.e. visible matter equations have the curvature d^2p/dv^2 as positive, $d^2p/dv^2 > v$, whereas the elliptical state equation for the dark matter dark matter has negative curvature, $d^2p/dv^2 < v$. (Table 1.).

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8.   ---*Part XI: Interactions and Transformations* Page posted November, 2020.

9.   --*Part XII: Visible to Dark Matter Transformations*. Page posted June 2021.

10. -------------------------------------*Part XIIII: Gravitons and a Centered Linear Equation of State. Posted August 2021*

11. -------------------------------------*Part XIV Dark Energy and a Centered Linear Equation of State. Page posted October 2021*

Appendix A.

Dark Matter and a Possible Solution to a Major Archaelogical/biblical : The Holy Shroud of Turin Image

The above account of the dark matter is that its equation of state is elliptical, <u>which means that its nature is rarefied and invisible .</u> Also, that the dark matter may form by a transformation from visible compressed matter, accompanied <u>by the emission of microwave strength kinetic energy</u>.

 This may be relevant in partially solving a famous historical/archaeological/biblical problem, namely, the origin and

explanation for the mysterious Image on the Holy Shroud of Turin (www.shroudscience.info). It is rather widely agreed that the striking image could have been formed on the linen Shroud by a" burst of radiation". **We now ask was it   coming from the dead Body of the Man in the Shroud, namely   Jesus Christ** The origin of the image forming radiation has been a mystery, but the optical characteristics of microwave radiation would fit such radiation being a cause of the observed Shroud Image[   ].

Some of the theories for Shroud Image formation now seem to be related to the new   cosmological theory and data described above _and_ to rhe emission of microwave strength energy as a source of the "burst of radiation" just mentioned above which could have formed the mysterious Shroud Image.

We have just summarized the dark matter facts as follows:

Cosmologically, today there may be **an ongoing   transformation of visible matter of the cosmos into dark matter,** accompanied by **a release from the visible matter as it disappears, of its microwave kinetic energy** which remains behind as a detectable remnant of the transformation process.

Now in hman history there **is an extrardinary event**, namely the crucufuxion of Jesus Christ witth facts as follows: He was crucufued on a Friday and his Body placed in a tomb which was sealed in the uusual manner with a rolled stone, **On the following Sunday the Body was gone, leaving behind the burial linens, principally the enveloping linen Shroud.**

Centuries later the linen shroud becomes well known in the possesion of the Byzantine emperor . Now it also known as The Holy Shroud of Turin, **bearing the faint, front and back, full length, sepia image of the body of a crucified dead man. It is kept in Turin, Italy.**

The general consensus today is that the Image on the linen Shroud could have been caused by a burst of Microwave radation. , since microwaves have the energy levels and optical properties needed to explaiin the shroud image process , and in detail .[Ref. www.shroudscience.info]. We now ask could such a burst of microwaves, released from the dead body in the Shroud in a visible- to- dark matter transformation, have caused the Shroud Image?

Our thesis then is that is that this image forming radiation was microwave type released in a transformation of the enveloped dead Body from a visible hyperbolic state to a rarefied, invisibke, dark matter state , i. e. with an elliptical equation of state.

Thus, the ancient historical facts and the modern Scientific facts on the Shroud and its Image are now apparently both supported by results of our 21ˢᵗ century cosmological investigation.

Further Questions

The cosmos is expanding and this expansion is apparently acceleraing . Also we have speculated that the transformation of visible to dark matter is promoted by expansion .**Thus we are led to think a general transformation** may then be the next phase in some cosmic future --- that is, a world of rarefied matter of some sort.

While this is speculative, we do now have a physivcal argument for the process of such a cosmic tranformation of matter and the release of the excess energy as microwaves.

In the case of the Shroud of Turin, one most interesting matter would b **the presence of a vortex in the Tomb .**

St. John the Evangelist, an eye witness of Easter morning events writes:

"Early in the morning on the first day of the week, while it was still dark, .Mary Magdalen went to the tomb and found the stone moved away from the   tomb door.

So she came running to Simon Peter and that other disciple whom Jesus loved ; They have carried the Lord away from the tomb , she said to them, and we cannot tell where they have taken him.

Upon this , Peter and the other disciple both set out and made their way to the tomb; they began running side by side, but the other disciple outran Peter, and reached the tomb first. He looked in and saw the linen cloths lying there but he did not go in. Simon Peter , coming up after him, went into the tomb and saw the linen cloths lying there, ,,,,,,,,,
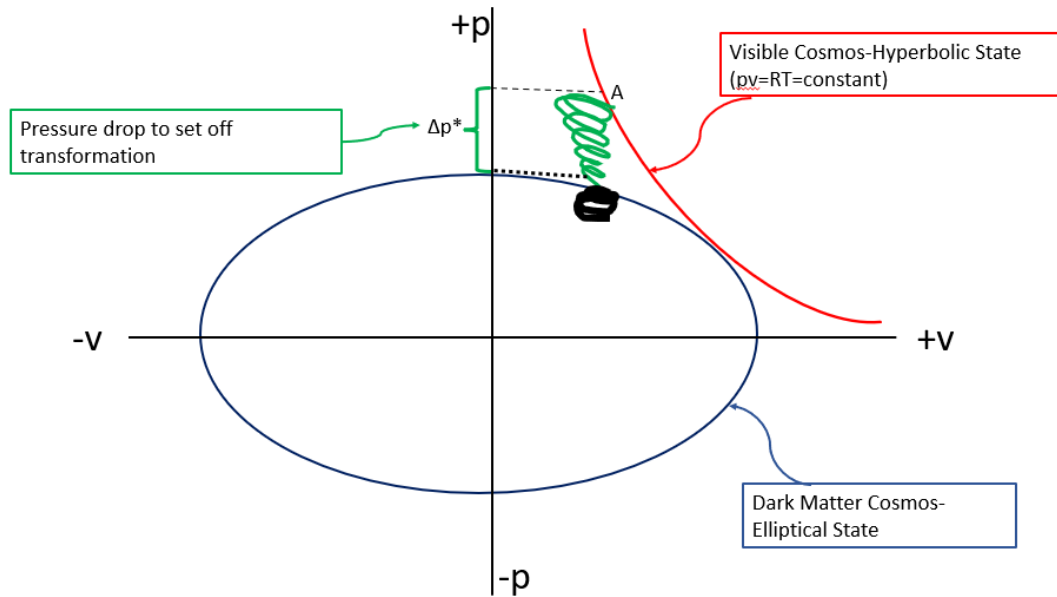
<u>and also the veil which had been put over Jesus' head. not lying with the linen cloths but, still wrapped round and round in a place by itself.</u>

Then the other disciple , who had reached the tomb first , also went in, and saw this and learned to believe. Thay had not yet mastered what was writtrn of him, that he was to rise from the dead.................. *".The Gospel according to John*

We now ask: Is the Veil "all wrapped round and round "**a sign of a vortex having taken place** in the tomb? What caused this 'wrapping around' and also moved the Veil to another place in the tomb?

We also ask Q . Why did the shroud not also get moved? It would appear that a vortex must precede the complete transformation of the Body in the Shroud. In that way the shroud would be anchored by the weight of the Body it enclosed. The Veil, which wsas placed on top of the Shroud at the body's head was free to be moved by the swirling vortex.

[We have previously written on the possible role of galactic vortices in producing a pressure lowering to help trigger visible- to- dark matter transsformation in galaxies. (Ref.) and Figure 2. below.]. The scriptural reference in St. John's gospel seems to bear on that scientifical speculation and transformation in some way not yet completely understood.

Figure 2.   Pressure Drop in a Strong Galactic Vortex (Δp*) Sufficient to Set off a Visible -to- Dark -Matter Transformation

 (Point A on the Visible cosmos hyperbolic curve is the pressure and specific volume (pv) point, where the transformation vortex starts. The dark tip of the vortex represents dark matter formed in the low pressure vortex core by transforming from visible matter which has been sucked into the vortex core and expanded to sufficiently low pressure to reach the dark matter pressure and so to transform."

Note : Figure 2 and commentary were posted io this site in December 2022 in Web page "The Mysterious Dark Matter".

 The Gospel reference to the Veil being "wrapped round and round" would seem to refer to a vortex in the Tomb on Easter Morning.

Some Church Notes

Catechism of the Catholic Church

Section   1047

The visible universe is itself destined to be transformed, etc.   etc."

 Section 1048

"We know neither the moment of the consummation of the earth and of man, nor the way in which the universe will be transformed .The form of this world, distorted by sin, is passing away, and we are taught that God is preparing a new dwelling and a new earth in which righteousness dwels, in which happiness will fill and surpass all the desires of peace arising in the hearts of men".

Section 1049

"Far from diminishing our concern to develop this earth, the expectancy of a new earth should spur us on, for it is here that the body of a new human family grows, foreshadowing in some way the age which is to come, etc.. etc."

Note : In 2004 there was a radiocarbon testing of the age of the cloth.The results were given as about 1290 A .D.

However, when the presence of around 100% irremovable heavy soiling at the test corner site is properly taken into account, [specific weight of test sample before test, 53 grams per sq. cm. ,specific weight of rest of shroud 23 gr per sq cm] the result is that the age of the shroud is 1st or 2nd century or **"ancient"]** [Ref.**www.shroudscience. info**].

One of the principal investigators in the radicarbon test apparently remarked some time after publication that there was actually a 'loss in weight´ in the cleaning of around 20%. This , apparently an afterthought, has not been taken into account. Our **'ancient age'** conclusion remains.