

## **Part XVIII**



# **The Mysterious Dark Matter: A New Solution**

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## **Contents**

### **Background**

**Nature of Dark Matter: An Expanded or Rarefied Molecular Form**

**A Source of Dark Matter: A Visible-Matter -to-Dark- Matter Transformation Process in Galactic Vortices**

### **Comments**

**Light for the Dark Matter World**

**Possibility of Experimental Tests for Dark Radiation and Dark Matter**

**Some Relevant Further Questions**

**Table 1. Curvature Criteria ( $d^2p/dv^2$ ) for Determining Wave Type**

### **References**

## **Background**

Very little is known about the mysterious dark matter of the universe other than that it is invisible, and that it does not interact with ordinary or visible matter except that it gravitates. It makes up about 29% of the cosmos compared with 4.9% for the visible matter and 69% for the dark energy.

## **Nature of Dark Matter: An Expanded or Rarefied Form**

However, if we assign to dark matter **the elliptical equation of state**  $[p^2/b^2 + v^2/a^2 = a^2 b^2]$ , we can apparently make progress in solving some of the mystery.

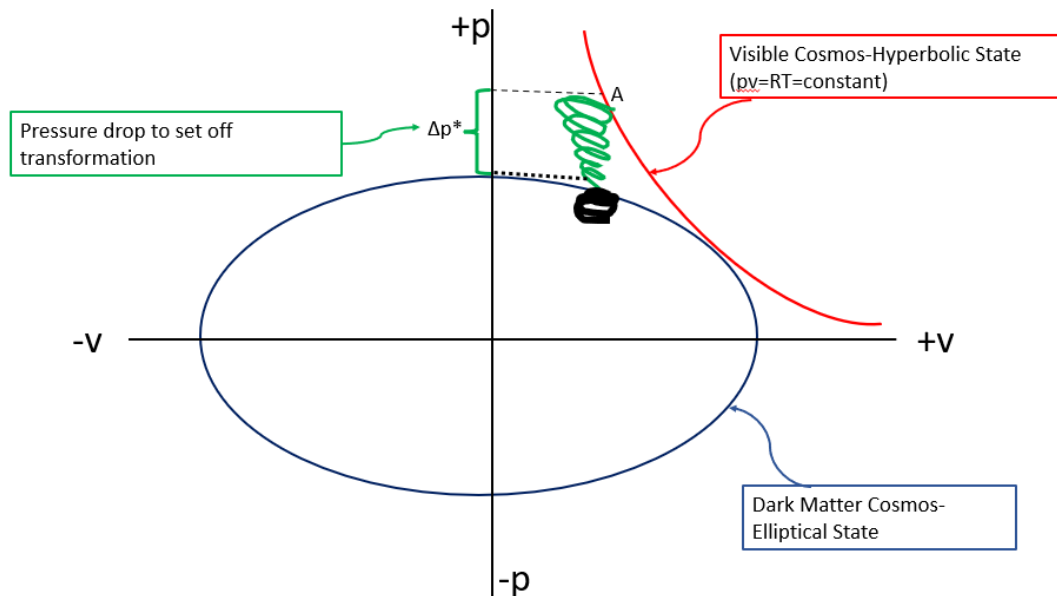
In the Equation of State for compressed visible matter, i.e. the hyperbolic Ideal Gas law,  $[pv = RT]$ , compression waves persist which may grow to strong compression shocks; **compressed visible matter** emerges from these strong shock compressions e.g. as muons, pions etc. in the Big Bang shockwave and its aftermath.

**Our dark matter hypothesis** is that, unlike visible matter's compression nature, **dark matter is rarefied** or expansive, instead. Its Equation of State is elliptical  $[p^2/b^2 + v^2/a^2 = a^2 b^2]$  which supports only rarefaction waves and the rarefaction shocks from which emerges the dark matter 'forms which make up 29% of the universe. Its rarefied or expansive nature also **renders it invisible** to a compression world such as our world.

## **A Source of Dark Matter : A Visible Matter to Dark Matter Transformation in Galactic Vortices**

**Our hypothesis** is that the dark matter is invisible because it is a rarefied matter form. Ordinarily, for the same reason, it does not interact with visible matter except via gravity. However, **at sufficiently low pressure, say in galactic vortices and high speed jets, it, where the pressure is low enough, may not only interact with ordinary visible matter, but, we believe, it then may cause the ordinary matter to transform into dark matter. Fig.1**

Radiation is emitted because



**Figure 1. Pressure Drop in a Strong Galactic Vortex ( $\Delta p^*$ ) 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.

We also note that the visible to dark matter transformation process should be accompanied by an emission of Microwave radiation. This is because a molecular shift from compressed form to expanded form, such as takes place in visible to dark transformations, would necessarily involve the release of excess molecular rotation bond energy which would be microwave wavelength. Interesting enough, the Milky Way is considered to be about 90% dark matter. and there is also apparently a 'mist' of microwave radiation spread all through the galaxy.

## Comments

This transformation process of visible to dark matter can theoretically account for dark matter formation. What portion of the total calculated 29% comes from the inflationary expansion which mediately followed on the compression of the Big Bang is a question.

Currently, these transforming low pressure vortices and jets, where dark matter forms from ordinary matter, are spread only sporadically throughout the cosmos. However, our universe is expanding as a whole, and so its pressure will conceivably drop overall to eventually reach the dark matter transformation point. Does this mean an eventual 'end of the present world' scenario? Is our visible world eventually to come to an end and be succeeded by a dark matter cosmos?

Since compressibility theory appears to predict this eventual transformation of our visible world into dark rarefied matter, we perhaps should add, that, in a general sort of way, this prospect appears to accord with the theologies and some philosophies which have 'end-of-the-world' teaching coupled with some 'world to come' beliefs.

## 'Light' for the Dark Matter World

We now postulate that a 'dark radiation' state also exists to parallel the E/M radiation that illuminates visible matter. We can do this because the same non-centered linear equation of state  $[p = Av \pm v]$  that supports the finite compressed E/M radiation waves, also theoretically can support finite, stable **rarefaction** **E/M** waves which can logically then be assigned to this dark radiation.

## Possibility of Experimental Tests for Dark Matter and 'Dark' Radiation

While we are searching for examples of visible to dark matter transformations, we should also be open to the possibility of finding an experimental means of carrying out these visible to dark transformations and studying them.

One basic approach would seem to lie in some means of matching the pressures involved. For example, we have suggested that the E /M waves are stable compression waves in the linear non-centered state , [  $p = \pm Av + B$  ] , while ‘dark radiation’ waves would be stable rarefaction waves in the same linear non-centered state equation . While the pressures are likely to be quite different, the state equation is the same.

.Other openings may suggest themselves.

### Some Relevant Further Questions

We have mentioned above the pressure lowering potential for dark matter formation in high speed astronomical jets. How prevalent would this jet process be, say in our Milky Way?

Why is the dark matter’s pressure systematically lower than the pressure of visible matter as postulated above? ( Fig 1). Is it related to rarefaction?

Is there a dark matter E/M radiation , or dark matter ‘light , i.e. a radiation similar to our compressional, photonic E/M radiation, only for the dark matter cosmos. Could it possibly be experimentally detected ?

What can we infer about the probability of a possible total conversion of our visible cosmos to a dark matter cosmos? Would this cosmological ‘end times’ scenario usher in a rarefied matter cosmos?

Does this dark matter formation hypothesis mean that a portion of the **‘black holes’** in spiral galaxies are actually dark rarefaction matter sites actively forming from visible matter in the low pressure cores of these transforming spiral galaxies?

## 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 **hyperbolic** (convex upwards) Ideal Gas Law

**Visible matter state** [ $p v = RT$ ]

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 elliptical (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** ( $p = A v \pm B$  Both E/M radiation ( and ‘dark radiation?’).



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

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

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

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*“Then I saw a new heaven, and a new earth.*

*The old heaven, the old earth had vanished,*

*and there was no more sea”*

*Apocalypse 21, 1 ----St. John The Apostle*

