Part XIX

Compressible Flow and Cosmology - A Review

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Introduction

For many years we have been applying compressible flow theory to various cosmological problems. (Refs. 1 -19)   We shall deal with its application to the Dark Primal Energy, then to Gravitation, Radiation, the Big Bang, Visible Matter and to the Dark Matter.

In Appendix A we briefly discuss a remarkable Archaeological Application.

Chronology of Equations of State amd Their Interactions

- **These equations (Fig. 1) give the relations** among the thermodynamic variables such as pressure and specific volume, temperature, density, entropy etc. The one describing our visible compressed matter cosmos is the hyperbolic, Ideal Gas Law. The elliptical equation of state describes the rarefied state dark matter cosmos. The linear centered equation describes the dark energy state.   The linear non-centered state describes

radiation. The centered circular equation applies to quantum gravity. The dark energy is a primal wave continuum which furnishes pressure - volume pv -energy to the succeeding four wave states just listed.

A basic interaction in compressible flow is the wave pulse $\Psi = (c - V)$ whose energy is $\Psi = (c - v)^2 = c^2 - 2cV + V^2$, where c_o is the continuum maximum wave speed when the flow speed V js zero.

Now the flow velocity V is purely relative so that general relativity applies where appropriate.

As an example of application let us take the interaction of the primal dark energy interacting with the circular state to form wave. pulses Ψ. Then we can see that the interaction of the two states gives rise to a mixed 2cV interaction energy term of primal speed c and graviton flow speed V. Similar flow pulse interactions take place successively with other cosmological states, linear, hyperbolic and elliptical to form the major cosmic systems.
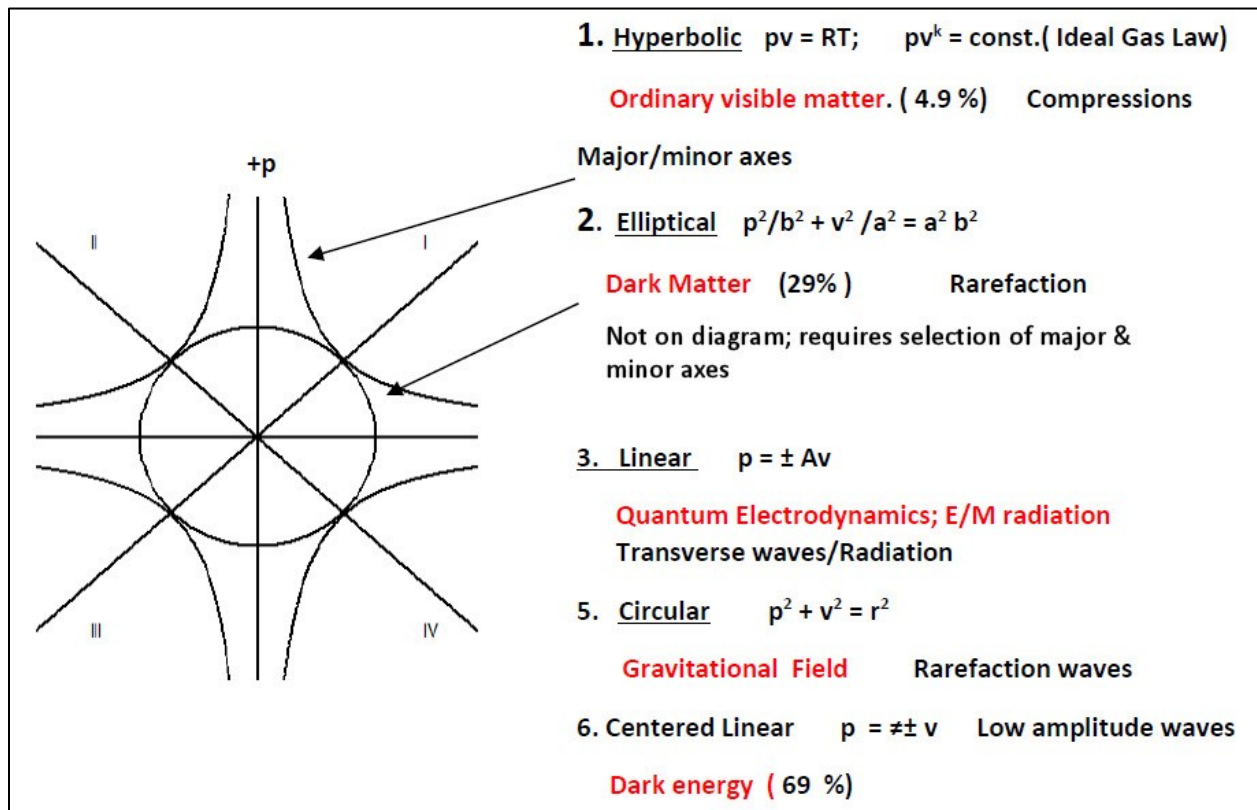

1. **Hyperbolic** $pv = RT$; $pv^k = const.$ (Ideal Gas Law)

   Ordinary visible matter. (4.9 %)   Compressions

   Major/minor axes

2. **Elliptical** $p^2/b^2 + v^2/a^2 = a^2 b^2$

   Dark Matter   (29%)   Rarefaction

   Not on diagram; requires selection of major & minor axes

3. **Linear** $p = \pm Av$

   Quantum Electrodynamics; E/M radiation
   Transverse waves/Radiation

5. **Circular** $p^2 + v^2 = r^2$

   Gravitational Field   Rarefaction waves

6. Centered Linear $p = \neq\pm v$ Low amplitude waves

   Dark energy (69 %)

Figure 1. Equations of state

Note: In the above graph, State   No.2 – Elliptical – has been graphed as being circular simply for reasons of graphical economy, the difference between elliptical and circular being simply one of a difference in the magnitude of the axial

intercepts a and b for the elliptical state, and being equal for the case of the circle.

The Radiation Era

Step 1

Step 1. Emergence of Primal Dark Energy and Formation of Quantum Gravity. We begin with   the centred **primal Dark Energy linear equation [p = ± v]**. This equation of state describes the action of a primal wave continuum which furnishes pressure- volume energy to drive the four compressible states of gravity, primal radiation, visible matter, and dark matter

We postulate that this Primal dark energy State **immediately interacts** with the Circular centered Equation of State [$p^2 a^2 + v^2 b^2 = r^2$] **to form a gravitational field** which is propagated in space-time as the Graviton Quantum Field Ψ.

Since the curvature of the circular state is ($d^2 p / dv^2 > 0$) then the emerging gravitons are **rarefied** and produce an attractive force in the gravitational pressure gradient force field.

The Quantum Graviton Ψ **is massless and has spin -2 as follows**:

. **For the photon** the number of degrees of freedom of energy is n =3. Therefore the photon spin S = (n -1)/2, or (3 -1) 2 = 2/2 = Spin 1., **For the graviton** , taking degrees of freedom at n = -3, we have spin S = (-3 -1) / 2 = -4/2 = -2, which agrees in magnitude with a requirement of general relativity for a Spin 2 graviton.

We postulate that the density in this gravitational/quantum field is such as to give **a gravitational/quantum wave speed** of

$$G/h = 6.67 \times 10^{-11}/ 6.63 \times 10^{-34} = 10^{23} \text{ meters per second}$$

This wave speed is truly enormous However, it seems justified, in that it solves certain major problems in quantum physics, such as the 'action at a distance' problem, and also the 'collapse of the wave function' problem. Physically it appears to require that the dark energy interaction with the circular gravitational quantum field gives a quasi-solid wave continuum. The benefits are that the major quantum field problems just cited are thereby solved. Experimentally, the Aspect et.al. experiments also confirm this huge quantum wave speed proposal. The other wave speed associated with radiation and light and with material waves is that of light and E\M radiation, designated by c.

Formation of Radiation.   For this second Event we propose the interaction of the primal dark energy centered linear equation with the non-centered linear equation [p = ±av + c] to form a **transverse electromagnetic radiation field.**

Interaction of Primal Dark Energy with Non-centered, linear Eq. of State to form electromagnetic radiation quanta Photons (radiation) and Celestons (Dark Matter radiation (Fig. 2))**:** Interaction of linear Primal Energy with the linear Tangent Equation to form compressed visible Photons (Radiation Quanta) and Rarefied invisible "celestons" (i.e. "dark" radiation quanta (hypothetical).

[It appears possible that this primal radiation field was the source of the odd galaxies that are being seen by the James Webb Space Telescope rather than them forming in the Big Bang event which we place later cosmologically.]

The Visible Matter and Dark Matter Era
[The Big Bang]

Step 2

Step 2: The Big Bang Event: Interaction of Primal Dark Energy with the hyperbolic state to form visible matter. This takes place in two steps, first a super shock compression and then, second, a super inflation shock. First, a super strong compressional shockwave in the hyperbolic state forms the initial cosmic state of visible high density and high temperature hadronic matter, and then immediately a super inflation shock occurs in which the leptons form. and development takes place as per Big Bang theory.

To repeat, first the dark energy interaction with the hyperbolic state sets off a super strong compression shock wave in the hyperbolic state **thereby providing a physical basis for the Standard Model's Big Bang and its postulated initial high density and high temperature**. Then, almost immediately, **a super inflationary expansion or pressure recovery** takes place, supplying a physical reason for the big Bang's super inflation phase. with its formation of elementary particles and of visible matter. [4.9% of total mass-energy].

<h1 style="text-align:center"><u>Step 3</u></h1>

<u>Step 3:The Formation of Visible Matter and The Dark Matter</u> : Interaction of the Primal Dark Energy with the **<u>elliptical</u>** state to form a strong **<u>rarefaction</u>** shockwave in which the rarefied dark matter of the cosmos (27%) is formed. Inflationary rarefaction of hyperbolic big Bang compression forms. This   is completed with the emergence of visible particles of matter as per the Standard Model and the Big Bang theory.

It seems possible that the necessary strong rarefaction or expansion may have been   associated with the super inflation of the Big Bang of Step 3 in some way, perhaps by way of a trigger effect of some kind.

In Ref 19   we also described a possible transformation from the visible matter to dark matter apparently going on sporadically here and there in the cosmos wherever the cosmic pressure is low enough to penetrate into the dark matter cosmos.   In this transformation the visible matter transforms from atoms and molecules to the dark matter forms whatever they may be. **<u>As the visible matter's molecular bonds rotate or are broken, the emission of microwave radiation takes place .</u>** For example the Milky Way is today about 90% dark matter and there is apparently   a " mist " of microwave radiation spread throughout the galaxy. (<u>From this evidence there may possibly be a way open for such a transformation to be experimentally duplicated in the laboratory on a microscale.)</u>

 A Universal Cosmic Principle

We have over some years introduced a series of four or five equations of state to deal separately with various cosmological problems. This raises the question Is there any **<u>overall physical principle involved</u>**.?

To answer, it is generally agreed that the dark energy **exerts pressure,** so as to cause the observed expansion of the cosmos, and it obeys general relativity. On both these counts we can conclude that **<u>the primal dark energy, to act in such a manner , must be compressible and be a wave continuum, and we therefore have our universal cosmic principle that the universe is a progression of wave forms and their interactions.</u>**

To repeat, it is generally agreed that the dark energy **exerts pressure** so as to cause the observed expansion of the cosmos and it obeys general relativity. On both these counts we can conclude that **<u>the primal dark energy, to act in such a manner, must be compressible and be a wave continuum.</u>**

<u>Next there is the dark energy interaction with the various equations of state.</u>

<u>First there is the interaction of the primal dark energy waves with the circular, centered state to form</u> **<u>the quanta of gravity Ψ and   the universal gravitational field.</u>** Then, there is the dark

energy wave interacting with the non-centered linear state to form **transverse E/M type radiation,** waves, visible photon or dark matter radiation as the case may be.

 Next, is the dark energy wave interaction with the visible matter hyperbolic state and with the dark matter elliptical state in **the Big Bang super strong shockwave** and the super inflation which immediately follows as per the Big Bang Model. The visible matter and dark matter are formed in and following this Big Bang Event.

 This succession of three major wave events **finally leaves the current expanding cosmos with 69% dark energy, 27 % dark matter and 4.9% visible matter.**

Summary

First, a dark energy pulse interaction with the centered circular state would set up a universal quantum graviton field. The gravitons Ψ would be massless and with spin -1/2, which agrees in magnitude with other estimates.

Then the centered, dark energy pulse with a non- centered linear field would produce radiation - condensed photons and a rarefied, invisible 'dark photons.'field.

Second an interaction of dark energy pulses with visible state condensed forms would produce a Big Bang super condensed shock wave immediately followed by a pressure inflation as envisioned and described in considerable detail by the Standard Model.

The super inflation probably is the trigger for the dark matter inflationary field to set off a shock wave in the elliptic rarefaction state so that this would account for the emergence   of the dark matter at roughly he same time as visible matter.

First Event

At first the Primal Dark Energy; which is a. compressible wave-forming continuum **flowed into existence**, forming space and time in the process.

It interacted with (or generated) another wave-forming entity to form **gravity quantum wave functions** and **a universal gravitational field**

Next the primal dark energy interacted with a second wave forming entity (the linear non-centered continuum) to form **Primal radiation**. This radiation may be the anomalous early radiation recently detected by the JWST space telescope.

Second Event

The primal energy reacts with the hyperbolic state continuum to set up the super strong shockwave known aa the **Big Bang** compression.

Third Event

The great shockwave compression ended in the Big Bang high density state and was immediately followed by the super inflation in which the formation of **<u>visible matter</u>** becomes completed as per the Standard Model.

Also, the inflation in the hyperbolic state is probably what triggers an inflationary shock wave in the elliptical continuum to form the **<u>Dark Matter</u>** of the cosmos.

This process of dark matter formation is apparently ongoing, with visible matter transforming into dark matter sporadically and here and there. For example our Milky Way is now about 90% dark matter .

The entire cosmos is now composed of 69 % primal dark energy, 27% dark matter and 4.9 % visible matter.

Relevant Further Questions

 What lies beyond this world? Any clues in cosmology? This is a question of almost universal interest and on many levels, for example Science, Philosophy, Religion, and popular curiosity, Natural Theology, etc.

Is the Dark Matter "A World to come?   "

 [Note: The formation of the Dark Matter by a transformation from visible matter seems most likely to yield   insight into some of these further Questions (Ref 19)

For example in the Milky Way such an ongoing transformation has already apparently left our Galaxy with 90% dark matter and a typical background field of microwave radiation.

The implication is that the process will continue as the visible compressed universe continues to expand into Dark Matter favorable conditions, namely lower vacuum pressure. As to what the Dark Matter World is like, we can infer from its elliptical equation of state that its type of matter must be **<u>rarefied</u>** as opposed to our visible and compressed world. Also, the dark matter world is not to be considered without its own radiation since **<u>rarefied radiation</u>** is indeed theoretically possible.

Here we touch on a key point. It seems highly desirable that this visible matter to dark matter transformations process should be attempted on a sub-miniature, controlled, laboratory scale. Here also dark radiation could perhaps also be safely produced and studied.

"The Heavens Declare the Glory of God……………" Psalm 19-1
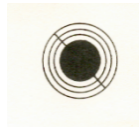
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Appendix A

An Archaeological Mystery and a Cosmological Analogy

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In summary, we have argued above that the dark matter is sometimes formed by a process of local transformation from visible condensed matted into a rarefied dark matter. This apparently happens sporadically here and there in the visible cosmos and its vortices such as in quasars or in other low pressure sites such as black holes. This process is also apparently accompanied by an emission of Microwave radiation since the change in form involves molecular bond rotation. The dark matter is rarefied in nature with an elliptical equation of state as contrasted with our condensed matter with its hyperbolic equation of state.

Now there is a famous matter in archeology which recalls this dark matter process. This archaeological matter concerns **the Holy Shroud of Turin** and the plausibility of a certain physical theory about its Image formation *which requires a transformation of visible matter accompanied by a release of Microwave radiation which can form a scorch image on any   enveloping linens and the Shroud.*

In this particular Shroud Image theory the visible matter of Christ's Body is postulated to have transformed to dark matter with the emission of molecular bond energy as Microwave radiation which is the 'burst of radiation' needed to correctly form the scorch Image seen on the linen Shroud.(Ref)

The existing scorch Image on the linen Burial Shroud was therefore plausibly formed by microwave radiation   released suddenly from the dead human body of Christ as it transformed from visible matter to some alternate form of matter and vanished from this visible world.   Thus it is similar, but not identical, to the cosmological local formation of dark matter from visible matter with the release of Microwave radiation. We refer to www.shroudscience.info.

References

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