

Announcing the Dark Matter Solution in the Dium TOE from the Intractable Studies Institute

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August 27, 2021, Patrick Rael, -Director

In the last couple decades there has been an ongoing search for the mysterious spiral galaxy constant-rotation velocity. What could make the spiral galaxy rotation velocity relatively constant to the outer edge of the galaxy when less visible matter implies less gravity? Dark-Matter was the answer, some mysterious gravity-causing something but which doesn't radiate electromagnetic energy. Recent studies of the Bullet Cluster collision of galaxies and associated gravitational lensing indicate that the Dark-Matter seemed to travel without impact, so it seems to be pure gravity. Whereas normal matter in the collision slows down, the Dark-Matter is slowed less and continues farther out in front.

*The [Dium TOE](#) (dium == dimension-ium) has a solution for this in Definition 19 and 7.1, 7.2. The continuous natural dimension 3-space (tridium) expresses mass and its warp of space (gravity) as a kind of "pinch" or dimple **compression** of space, like a pinch of a rubber sheet in 2-D but this is 3-D volume. The dimple is static, else if it were dynamic it would be an oscillation which is what neutrino oscillations are in the Dium TOE. Most particles except neutrinos have a charge which in the Dium TOE model is a static twist of tridium. If the charge (twist) is decoupled or stripped from the dimple, the dimple is exactly the Dark Matter: gravity without charge and thus non-interacting with ordinary matter. The exact mechanism of how these are decoupled isn't provided here, just that they can be. Dark-Matter is these combined dimples or warps of space lacking charge yet having gravity by their warps. They travel right through normal matter affected only by gravity. The decoupled charges, static else as dynamic twist oscillations would be an EM (Rotor) wave, are now without mass and their detection should provide supporting evidence for the decoupling. However, two equal and opposite charges (lacking mass) will attract to each other and seemingly neutralize each other so may be difficult to test for.*

This is not a peer-reviewed article. The Intractable Studies Institute solves intractable challenges and doesn't wait for others to catch up. Any objections that space is not an object should first consider that LIGO has confirmed gravitational longitudinal compression waves of space. That space which transmits the gravitational wave is the continuous natural dimension of the Dium TOE. The Dium TOE pre-dates the LIGO discovery. The Dium TOE is the product of 24 years of side-effort, 1990-2013.

The Institute is at the leading edge of Theoretical Physics using the Dium TOE to solve Dark Matter, Dark Energy and the reason for 3 Generations of Matter, and continues to advance this Reality-Class model of nature on several fronts. These are intractable challenges which are perfectly suited for the Intractable Studies Institute to solve. We've already made significant progress on these two. See the Dium TOE and [On Applying the Dium TOE](#) Communications of the Intractable Studies Institute for more details. The Dark Matter solution above and the Dium TOE that enables it should be easy candidates for the Nobel Prize in Physics as it provides for a final lowest level base of natural dimension for Physics. The Continuous nature of dium means there can be no lower-level model of space because continuous is final in the small. This should usher in a new discipline of study within Physics called Dimensional Mechanics, the Physics of Natural Dimensions. The introductory class would be Natural Dimension – 101. The 2-page Dium TOE would be appropriate for that introductory class. I could teach this class since I discovered it and its Laws.

Appendix 1 to Dark Matter Solution in the Dium TOE

(September 3, 2021)

When the word “natural” is used as an adjective to dimension that distinguishes it from the well known “abstract” dimensions of algebra and the Cartesian Plane. Whereas abstract dimensions spring into existence to plot 2 or more variables of data, the natural dimension 3-space volume that we exist in is not a dimension springing into existence to satisfy a plot of 3 or 4 variables. Natural means it exists in nature. In this case it is not merely a thing in nature like a rock, but a Dimension Type of object which is continuous and has extents and can contain other non-dimension type objects like particles, elements, compounds and rocks, etc.

The phrase “3-space” assigns the number of dimensions of the natural dimension, establishing volume. It is not merely 3 single 1-dimensional lines that intersect on graph paper as abstract dimensions do. It is a volumetric dimensional type object. The term “tridium” is the contraction of tridium or 3-dium, aka 3-space.

The word “continuous” means that while the dimension is extended, that extension is not a collection of discrete objects when zoomed into it infinitely. It means there is no lower limit of continuity. An example of a lower-limit is the Planck scale in Quantum Mechanics which by definition is discrete. But continuous natural dimension has no lower limit of continuity. The continuity is infinite “in the small”. This is outside the bounds of atomic principle theories which are discrete.

Comparing continuous to discrete is somewhat but not entirely analogous to the comparison of the abstract Mathematical real numbers and whole numbers. The real numbers are continuous. They have no lower bound where they stop being smaller. There are always smaller real numbers. Alternately, the whole numbers are discrete. Each chunk of whole number is the size of 1 unit larger than the previous and 1 chunk smaller than the next. The chunks do not get smaller. Fractions belong to the real numbers. Real numbers contain the whole numbers entirely, and so does the continuous tridium analogously contains discrete models like Quantum Mechanics.

The Dium TOE began from a blank slate without even dimension assumed. Then it declared what natural dimension is and its properties. In this sense the Dium TOE is very distinct from the Standard Model and Quantum Mechanics. Furthermore, the Dium TOE is a [Reality-Class](#) model because it addresses directly and initially what natural dimension is. The alternative Predictor-Class models don’t address this but instead are extremely useful at predicting how much will happen, but not what is. Often in Predictor-Class models it is meaningless to ask what is something, but instead calculate the values to predict the measure of something. Only a Reality-Class model such as the Dium TOE can answer “What is natural dimension made of?”.

In the Dium TOE, mass of a particle is described as a kind of “pinch” or “dimple” but ultimately is a compression of natural dimension 3-space. If the inner compressed region holds the compression then it is a static dimple. If the inner compressed region oscillates from higher density than surrounding region to lower density and repeating, then it is a dynamic dimple. The non-neutrino fermions (quarks and leptons) of the Standard Model are static dimples with constant mass. Neutrinos oscillate in their

dimple warp and thus have dynamic mass. They oscillate across all three generations of matter. Whether static or dynamic, as long as the compression does not involve a twist of space, then there is no charge.

In the Dium TOE, charge of a particle is described as a “twist” of tridium. The exact shape of the twist is not provided here. The twist cannot have a compression of tridium, else charge would give rise to mass. A static twist of dium is where the twist is non-changing. If the twist oscillates from twisting one way and then rebounding back across neutral to the other way and repeating, that is an oscillation such as the electromagnetic wave. The EM wave twist doesn’t compress tridium anywhere and thus has no mass warp of space. The shape of the twist is such that it can have an opposite shape to account for positive and negative charge. Fractional charges may be the amount of twist and/or other properties of the shape of twist. Finding the exact shape(s) of twist charge would make good research projects at CERN, Fermilab and/or LIGO.

The mechanism that determines static versus dynamic oscillating dimple warps and twist charges of dium isn’t fully determined yet. The difference between the two is one is static and unchanging and the other is dynamic and oscillating. One can speculate that static is somewhat like frozen in time, the other isn’t. It’s possible to interpret that literally as the static form of the warp and charge as being anchored just beyond the leading edge of the time also known as the dynamic Now in the Dium TOE. History, aka Chronodium in the Dium TOE, is static so it’s a well known source of unchanging property. Alas, there is one change that static warps and charges can experience to transition and that is annihilation of matter and antimatter particles of same mass and opposite charge. The twists undo to neutral untwisted space and the warps unwarp to neutral smooth space. However, annihilation is exceptional and existential to the particles; it’s during the existence of the particle that is in question and whether during that time it is static or oscillating so annihilation shouldn’t necessarily except this line of speculation. This is TBD and would make good research projects at CERN, Fermilab and/or LIGO.

Does the Dark Matter begin as a normal Standard Model particle and then transform into Dark Matter by having its charge stripped off it? Or can Dark Matter begin as a dimple warp of space without charge to begin with? Is it possible both of these can be true? These are TBD and would make good research projects at CERN, Fermilab and/or LIGO.

Can a compound aggregate particle like the proton and neutron get its combined charged stripped away, leaving the aggregate mass dimple warp of space and also the aggregate charge now decoupled? These are TBD and would make good research projects at CERN, Fermilab and/or LIGO.

The Dium TOE is very different from prior models of Physics, but only in that it defines a new lower Baseline of reality. That baseline is continuous natural dimension object of type Natural Dimension. The Dium TOE starts with a single 3-D Volume object with time progression as the entire universe, with several phases and properties including oscillations, stretch, compression, twist, flow, etc. As a lower baseline of reality, it allows higher level models like discrete Quantum Mechanics to layer on top of the baseline. Proving or refuting the Dium TOE and discovering evidence pro and con could involve thousands of physics researchers at CERN, Fermilab and LIGO for decades.