

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.

“where the past meets the future – today”

www.iwprd.org

Overview – Part II

Part I of this presentation provides an alternative view of space time. Most often, new ideas – particularly of this magnitude – are viewed as suspect and highly speculative models and perhaps, rightfully so. For this reason, in Part I we limited our presentation to those “steps” in the development of the IWPD Scale Metrics (ISM) theory that are well established in physics or that can be validated to a high degree for the individual interested in fully and logically exploring the claim in each step.

One of the goals of Part I was to establish a strong case for the argument that the relationship for determining observed velocity (3-Velocity) does not need to be an orthogonal relationship. It is valid to describe this relationship as a linear subtraction multiplied by a mathematical scalar that is defined by the “orientation” value X . Efforts were made in Part I to document that this mathematical scalar (X) is physically significant and helps to define or describe a number of physical relationships. The final “steps” of Part I were intended to show some of the immediate benefits of ISM theory.

The above stated goals were validated at, or near 100%. If you disagree with any of the steps we would like to hear from you with the case for where any errors or misstatements were made. Once we can agree, we can move forward in developing a physical explanation for the case made in Part I.

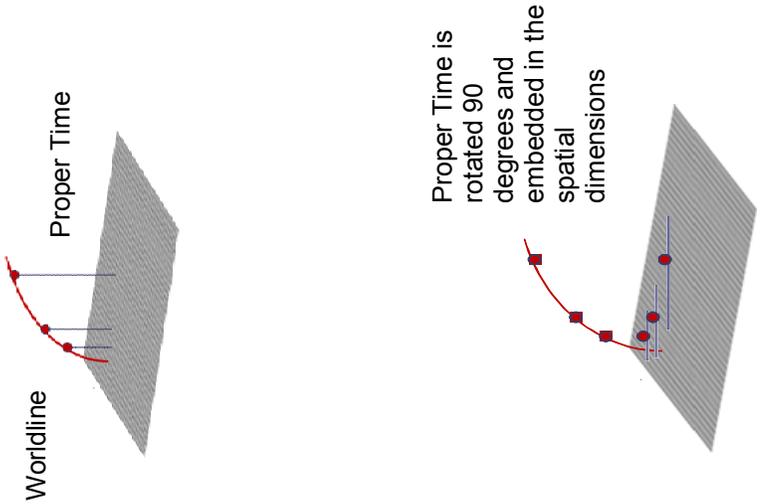
In summary, Part I provided:

- A value defined as “orientation” (X) that provides an absolute relationship between Kinetic Energy and Relativistic Mass and Velocity.
- That this orientation value (X) is involved in defining many relationships in physics.
- That X defines a mathematical scaling factor that allows velocity and momentum to be expressed in linear relationships between energy and invariant mass, 4-Velocity and Proper Time ($1/\gamma$), or universal length and proper length.
- X is related to the Lorentz Factor and provides a simplified way of describing the effect of a gravitating mass on space time which is significantly simplified over the Schwarzschild solution.

Part II provides a physical explanation that further supports the mathematical and logical development from Part I. We are not in a position to provide a 100% validation to these steps, but rather believe that they overwhelmingly support the validated steps from Part I by providing a strong physical explanation.

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

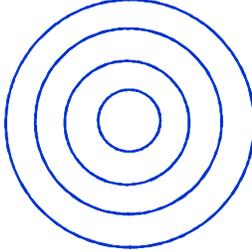
Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
1	<p>The case made in Part I is that 3-Velocity (Observed Velocity) can be determined via a linear relationship as opposed to an orthogonal relationship. This can be interpreted as reducing 4 dimensions to 3 dimensions.</p> <p>This can be accomplished by rotating the time dimension associated with a 4-Vector worldline by 90 degrees and embedding it within the spatial dimensions.</p>		<p>Proper time is rotated 90 degrees and plotted as a segment within the three spatial dimensions (in the case of the diagram, within the two-dimensional plane) suggesting a relationship exists between time and the scaling factor defined in Part I.</p> <p>For more information on this visit www.iwprd.org</p>

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.

“where the past meets the future – today”

www.iwprd.org

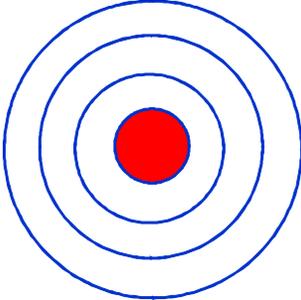
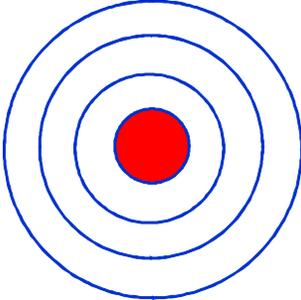
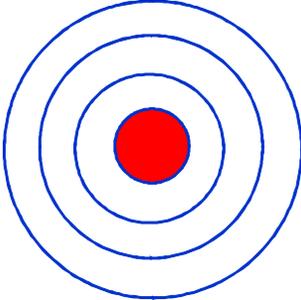
Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
2	Time is quantized and may be interpreted as “time segments” plotted (literally existing) within the spatial dimensions		On a philosophical level, the question becomes whether we move through time via an abstract orthogonal dimension – or, whether time moves through us as an expanding segment within the three spatial dimensions.
3	The time segment may also be viewed as a circle or ring by applying a factor of pi.		Therefore, one can define a quantum of time as either a segment or a ring plotted within the spatial dimensions.
4	A depiction of the quantum passage of time		One can depict the passage of time by ever longer quantized time segments that may be plotted as expanding rings in quantized intervals within the spatial dimensions.

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.

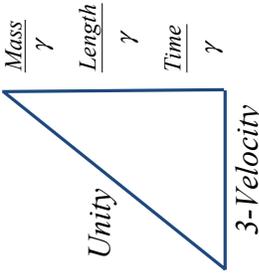
“where the past meets the future – today”

www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
5	<p>What is the nature of this quantum ring? The IWPD Research Center suggests that this is a physically significant entity. That is, it literally exists within the three spatial dimensions and is not solely a mathematical expression.</p>	$(3.38741 \times 10^{-43} s) \pi$	<p>The quantum entity of time is a physical entity defined by the fundamental quantum of time.</p>
6	<p>What is the source of time? IWPD proposes that time is created by the decay of mass into space where space is defined by time rings. In this way time and space are inter-related as a ring embedded within three dimensions defining both time and a spatial dimension.</p>		<p>While much of modern physics is built on the premise that everything can be described in terms of energy content, IWPD takes the equivalent position that the existence of mass moving at the constant speed of light creates energy. In this sense, we propose the existence of a fundamental mass serving as the quantum entity of mass.</p>
7	<p>Step 6 is observationally supported by the warping of space and space time by mass. Therefore, mass must communicate with space. IWPD suggests that this is not through a virtual particle but rather a real particle and that all mass is in the process of decaying with the quantum passage of time. It is the decaying of mass, resulting in the creation of both space and time that is responsible for the warping of space and space time.</p>		<p>All mass decays with the quantum passage of time. However, mass, length and time may very well be different manifestations of the same entity. Mass (composed of bound particles) decays through the emission of free particles. These particles are in the form of rings that define both free space and the passage of time; therefore, uniquely linking mass, space (length) and time as equivalent entities.</p>
8	<p>ISM Theory provides a relationship between the physics of the large (GR) and the physics of the small (QM). ISM defines the propagation of gravity using the most fundamental quantum entity.</p>		<p>Space time is warped by the emission of a quantum entity. This entity is a real particle and provides part of the explanation as to why gravity is so difficult to unify with the other forces, which are propagated via virtual particles.</p>

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

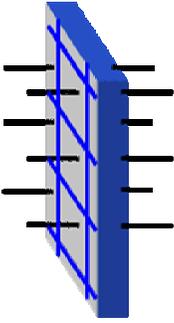
Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
9	<p>What is the nature of this quantum particle? The answer may lie in the Observed Velocity (3-Velocity) of an object. When using 4-Vectors, it is possible to relate 3-Velocity, as a fraction of unity, by comparing either time, length or mass to unity. Time, length and mass are all tied to the Lorentz Factor (γ) and therefore the IWPD Research Center proposes that mass, length and time are all different manifestations of the same fundamental entity.</p>		<p>Either mass, length, or time can be expressed as a fraction of unity through the Lorentz Factor and equally used to determine the 3-Velocity of an object (which is also expressed as a fraction of unity.) IWPD suggests that mass, length and time are actually (literally) different manifestations of the same fundamental entity which IWPD has coined the “energime.”</p>
10	<p>The energime defines unity values for mass, length and time:</p>	$2.18675 \times 10^{-73} \text{ kg} = 1$ $1.01552 \times 10^{-34} \text{ m} = 1$ $3.38741 \times 10^{-43} \text{ s} = 1$ <p>The speed of light is also equal to unity with a value of</p> $2.99792 \times 10^8 \text{ m/s} = 1$	<p>The energime is the fundamental entity of the universe. It expands (as a segment or ring) at the speed of light (unity) and may be manifested as either mass, length or time. Mass is composed of “bound” energimes. Space is defined by the number of free energimes emitted by all of the mass of the universe. Time is defined by the expansion of the energime ring at the speed of light.</p>

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.

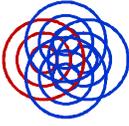
“where the past meets the future – today”

www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
11	<p>Fundamental values for length and time are consistent in magnitude with the established Planck Values. However, the fundamental value for mass is significantly different from the Planck Mass and represents a truly quantum entity, a building block mass from which all other mass and energy is a multiple of.</p>	<p>Planck Mass = $2.18 \times 10^{-8} \text{ kg}$</p> <p>ISM Fundamental Mass = $2.19 \times 10^{-73} \text{ kg}$</p>	<p>The ISM Fundamental Mass serves as a quantum entity of mass such that all other mass is a multiple of this value. This is equivalent to the role that Planck Length and Planck Time play as a smallest quantum entity.</p>
12	<p>The energime ring provides an unfamiliar geometry to the standard approach of plotting points on a Cartesian coordinate system. IWPD resolves this difficulty by realizing that the energime rings (segments) may all be aligned in the same orientation resulting in a 2-dimensional space grid (2DSG) composed of “points” that represent the intersection of the energime with the 2DSG.</p>	 <p>The intersect of cosmic scale energime rings cutting through the 2DSG</p>	<p>This means that much of physics can be explored with fewer (not more) dimensions. We can plot points on a 2DSG with the 3rd dimension defined by the “dimensionality” of the energime ring (segment).</p>
13	<p>ISM also suggests a misconception with the standard view of the evolution of the universe from an initial singularity. The concept of a singularity is relative to the “length” scale being used. The universe only gets smaller when compared against a constant unit of length, which provides an illusion – or at least an ambiguity – that the singularity is infinitely small.</p>	 <p>In the absence of any free energimes, the 2DSG defines a singularity regardless of its “size.” If the “length” scale is infinitely large, the 2DSG may also be infinite in “size,” yet still define a “singularity.”</p>	<p>ISM addresses this by clearly defining space as the number of free energimes present in the universe. The “size” of the initial universe – that is the 2DSG – is irrelevant. The singularity is solely defined by the absence of free energimes. The initial universe was composed entirely of mass (energy) oriented randomly on the 2DSG at a time (zero) when there was a complete absence of free energimes (space).</p>

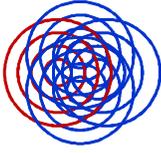
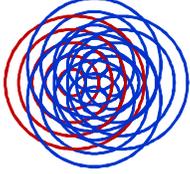
Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
14	<p>From this approach, ISM provides a complete definition of the initial singularity of the universe as the existence of only mass with no free energimes (therefore, no space and no time.) A singularity exists when the universe is composed only of bound mass with no free energimes (space).</p>		<p>Mass may be placed in any random way on the 2DSG without the presence of any space if no free energimes have been emitted.</p>
15	<p>Mass decays to free space as time progresses</p>	<p>Mass not shown, only free energimes are shown depicting the creation and expansion of space along with the propagation of time.</p> 	<p>Energime rings begin to overlay on each other creating a background field defined by all of the mass of the visible universe.</p>

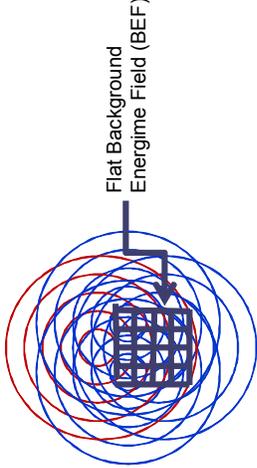
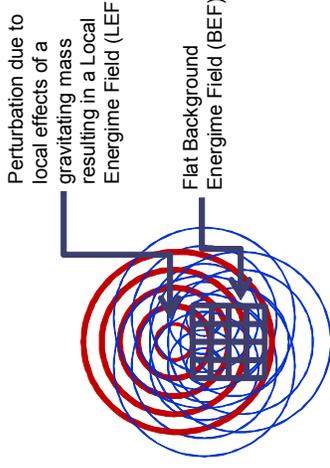
Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
16	Continued expansion of space with the passage of time		Energime rings continue to be emitted and intrude into the space of other energime rings.
17	Time and space are clearly intertwined as space continues to expand with the emission of free energimes representing time.		The energime values determine the local values for length, time and mass. As the energime rings overlap each other, the local interpretation of mass, length and time is different from that of the “universal” energime ring.

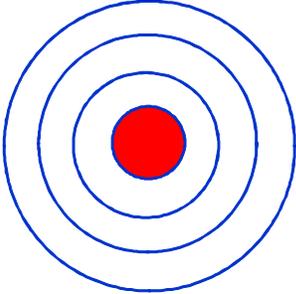
Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
18	<p>All of the mass of the universe creates a flat Background Energime Field (BEF) after a significant passage of time.</p>	 <p>Flat Background Energime Field (BEF)</p>	<p>A random distribution of mass on the initial 2DSG will produce an even concentration of free energimes given sufficient mass and time. This results in a flat space time.</p>
19	<p>A Background Energime Field (black) is defined in contrast to the Field established by a specific mass (red)</p>	 <p>Perturbation due to local effects of a gravitating mass resulting in a Local Energime Field (LEF)</p> <p>Flat Background Energime Field (BEF)</p>	<p>The geometry of the energime rings emitted from a specific mass are circular in comparison to the square (flat) nature of the Background Energime Field.</p>

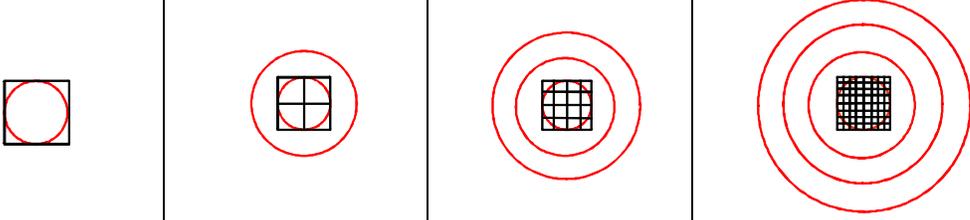
Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
20	<p>The Local Energime Field (LEF) is created when the local effects are overlaid onto the BEF. This results in a LEF which is not “flat” but the “length” of each cell increases as you move further away from the center of the “gravitating” mass.</p>		<p>Note how all of the mass of the universe creates space (BEF) that dilutes the strength of gravity providing an explanation for the weakness of gravitation relative to the other fundamental forces without the need for it to “leak” into other dimensions.</p>
21	<p>What then is the physical significance of the scaling metric?</p>		<p>The scaling metric is related to a fundamental entity that is not a particle, not a vibrating string over the Planck length, not a membrane in the eleventh dimension, but appears to be a segment or ring playing out within our 3 spatial dimensions on a macro scale. The universe is best described as rings and not points. Mass exists where multiple rings intersect and mass decays to individual rings defining free space.</p>

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.
 “where the past meets the future – today”
www.iwprd.org

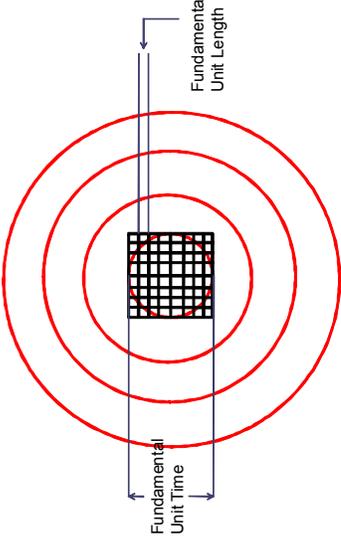
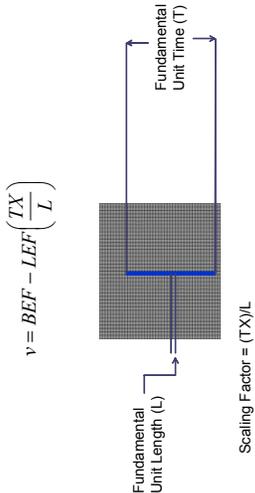
Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
22	<p>By tracking a single quantum through the passage of time we see the development of the need for a mathematical scalar to account for the difference between the local perception of energime unity values and the global perspective.</p>		<p>As time progresses, the initial quantum of time propagates at the speed of light and increases in size as the scaling metric decreases due to the intrusion of free energimes from the entire mass of the universe. This intrusion of free energimes results in an ever decreasing “length” scale as time progresses.</p>

Part II: A Physical Explanation of Three Dimensional Space Time

IWPD Research Center, Inc.

“where the past meets the future – today”

www.iwprd.org

Step	Logical or Factual Statement	Resulting Expression	Expansion / Supporting Evidence
23	<p>The physical explanation for the need of a scaling metric is due to the influence of all of the mass of the universe on a particular mass</p>		<p>The difference between the fundamental unit of time and the fundamental unit of length is that the fundamental unit of time is for a specific mass decaying into free energimes. The fundamental unit length is determined by the influence of all of the mass of the universe and the combined effect of all of the free energimes emitted by all of the mass of the universe. This overlaying of the effects of the entire universe over the decay of a specific mass creates a physical explanation of the scaling factor proposed by the IWPD Research Center. We experience the world through a scale that is different from the universal scale of an energime. Therefore, what we perceive as a momentum gap, is really a scaling factor.</p>
24	<p>The scaling factor from Part 1 $\sqrt{2X^3 - X^2}$ is directly related to the ratio of the Fundamental Unit Time over the Fundamental Unit Length.</p>		<p>3-Velocity can be expressed as a linear relationship between the BEF and the LEF multiplied by a scaling factor defined by the orientation value “X”. Part I was intended to provide a mathematical argument and in Part II we have developed a physical explanation in complete agreement with the mathematics in that</p> $\frac{TX}{L} = \sqrt{2X^3 - X^2}$
25	<p>The next question becomes, is this just a novel approach, or does it provide real benefits to our understanding of the universe? Part III of this presentation will provide some of the predictions and benefits of ISM theory.</p>		