RELATIVITY CHALLENGE

Part 1

INTRODUCING MODERN CLASSICAL MECHANICS

The Twin Paradox: Why it is required by Relativity
The Failure of the Relativistic Hypercone

(co-authored with Glenn Borchardt)

18th Annual NPA Conference
University of Maryland, Baltimore Maryland
July 6 – July 9, 2011

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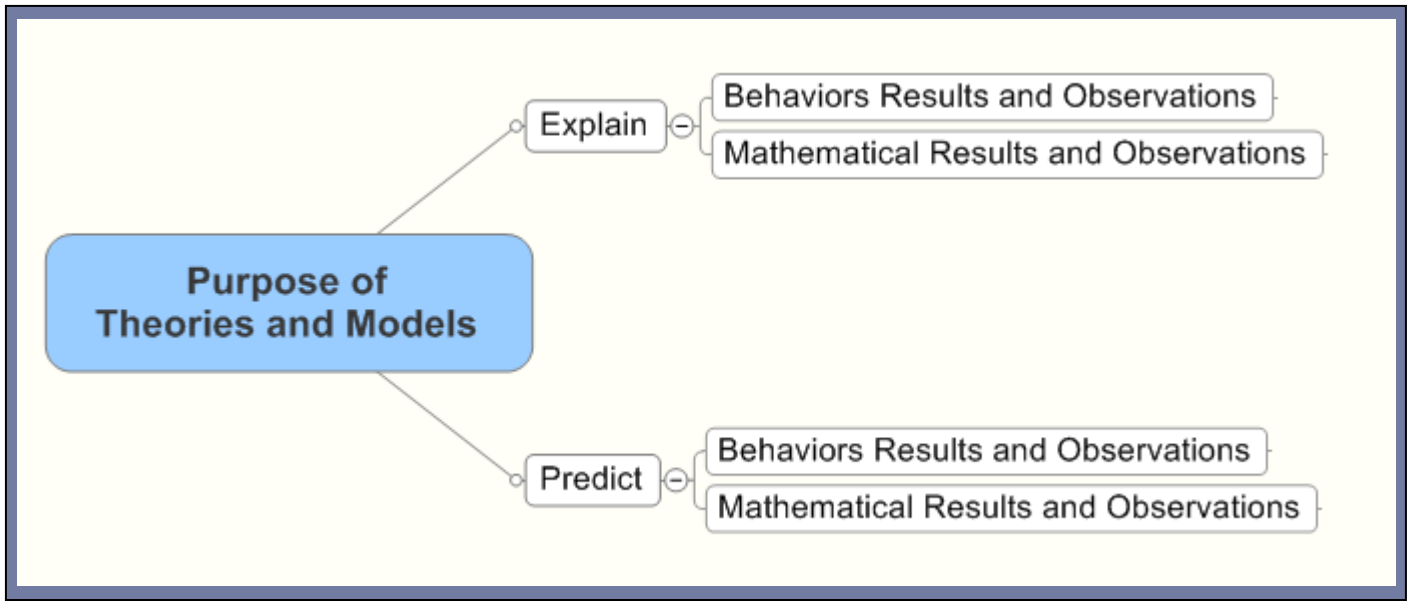
Science, Models, and Paradigms

Scientist develop **models and theories** that help them **make sense of the world**.



*Models that help us make sense of the world are **useful**.*

Science, Models, and Paradigms

Once established, **models and theories are difficult to change**, even if they are not intuitive, have gaps in what they explain, or are perceived (by some) as being incorrect or invalid.

1. People will only accept new ideas after the guardians of the existing ideas have died or moved on... This is not enough.

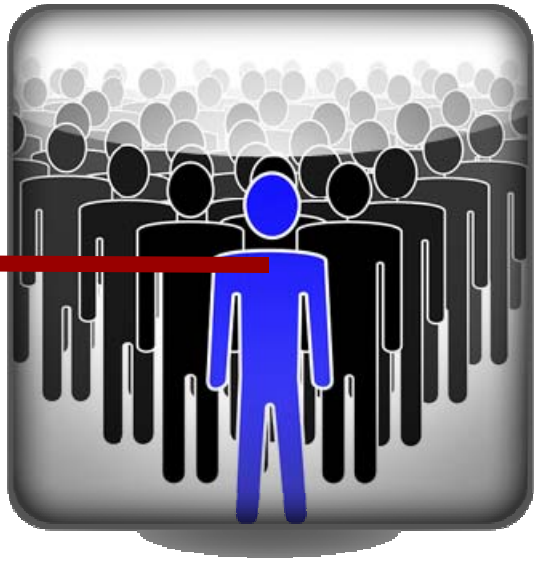
2. People will believe logical, rational arguments and change their beliefs and understandings... This is not enough.

Science, Models, and Paradigms

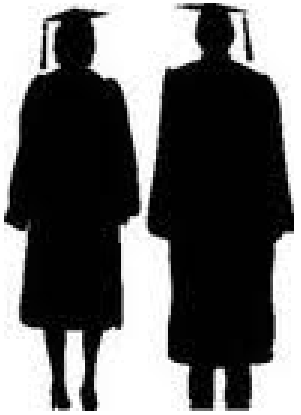
The idea that the Old Guardians must move on does not recognize the contributions of the remaining Guardians, nor does it acknowledge the possibility that a Guardian can be replaced by one, or more, newcomers.

Guardians of the Prevailing Model

An existing guardian retires or otherwise moves on

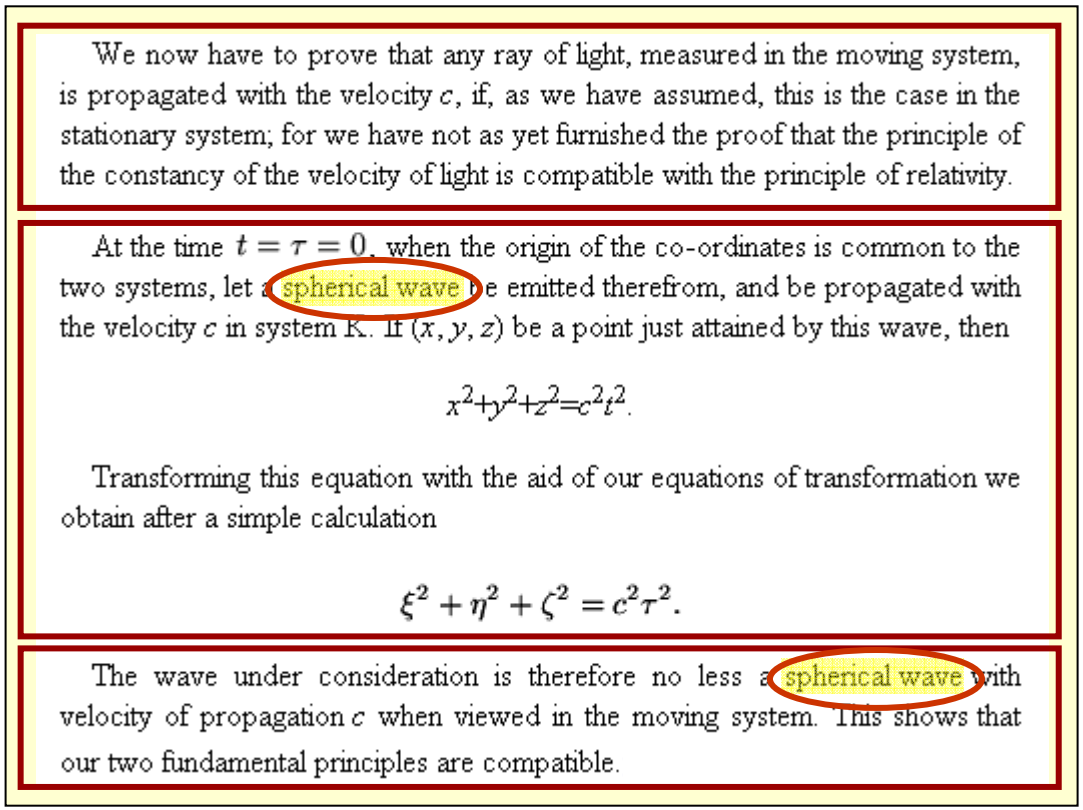


Multiple newcomers join the guardian ranks to replace any individual guardian who moves on



Science, Models, and Paradigms

In 2010, we showed that Einstein's proof establishing Relativity did not produce the required second spherical wave, but is believed to be correct due to a previously undetected Type I, False Positive, error.



We now have to prove that any ray of light, measured in the moving system, is propagated with the velocity c, if, as we have assumed, this is the case in the stationary system; for we have not as yet furnished the proof that the principle of the constancy of the velocity of light is compatible with the principle of relativity.

At the time $t = \tau = 0$, when the origin of the co-ordinates is common to the two systems, let a spherical wave be emitted therefrom, and be propagated with the velocity c in system K. If (x, y, z) be a point just attained by this wave, then

$$x^2+y^2+z^2=c^2t^2.$$

Transforming this equation with the aid of our equations of transformation we obtain after a simple calculation

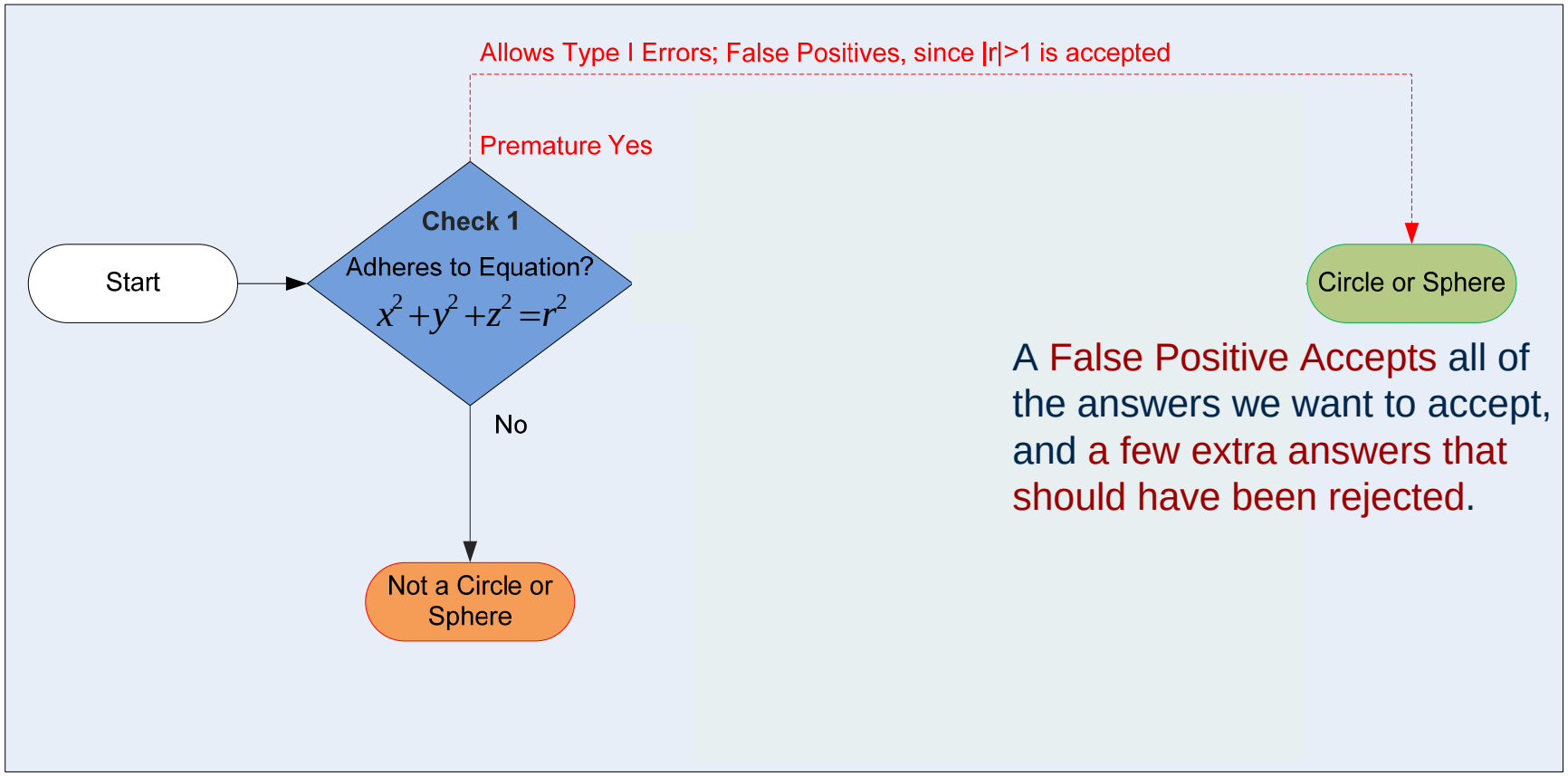
$$\xi^2 + \eta^2 + \zeta^2 = c^2\tau^2.$$

The wave under consideration is therefore no less a spherical wave with velocity of propagation c when viewed in the moving system. This shows that our two fundamental principles are compatible.

Source: Einstein's 1905 Paper

Science, Models, and Paradigms

In order to eliminate *Type I Errors*, or *False Positives*, all points must adhere to the equation of a sphere (3D) or circle (2D) **and** all of the points (x,y,r) must have the same radius.



Science, Models, and Paradigms

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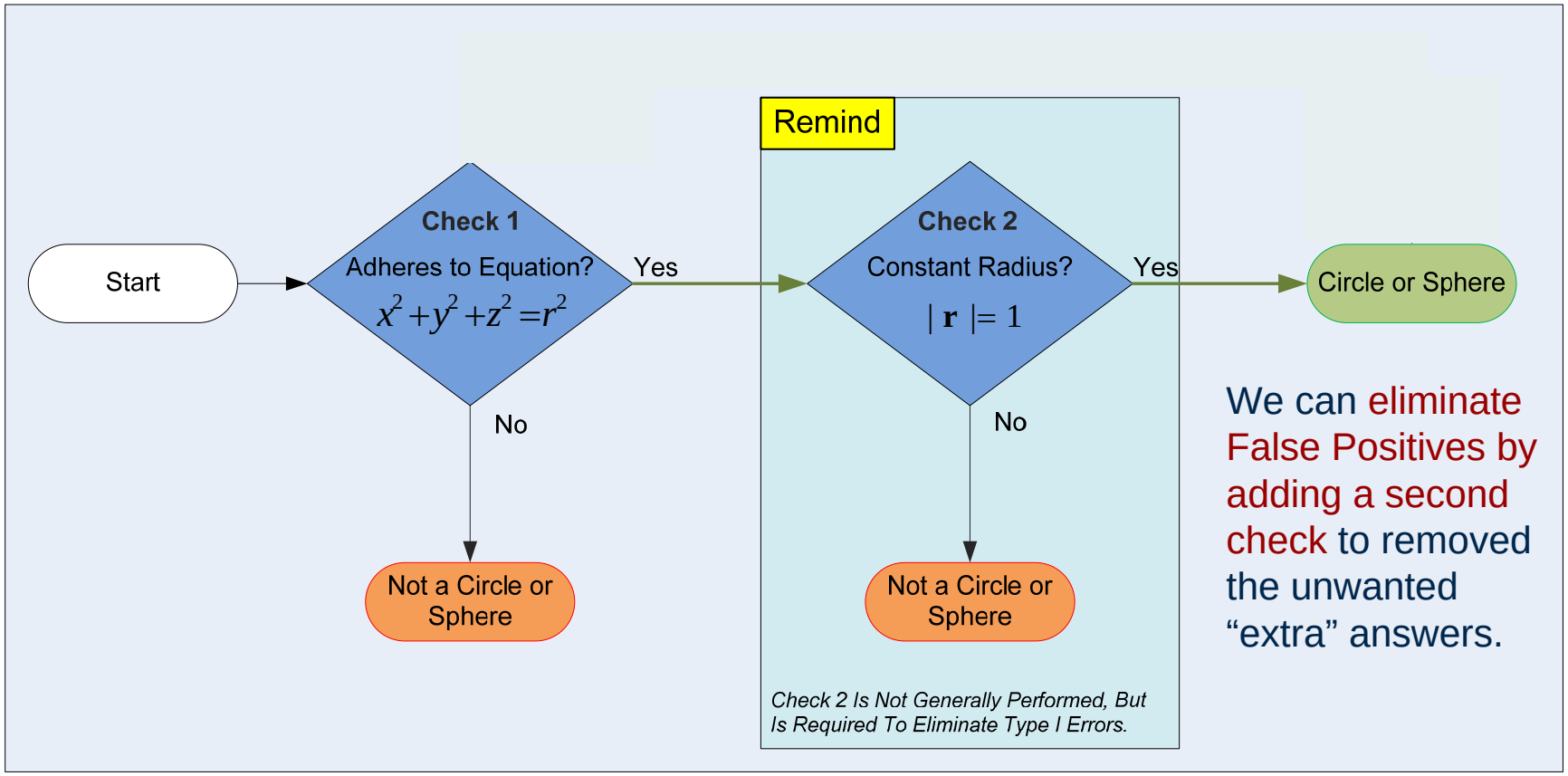
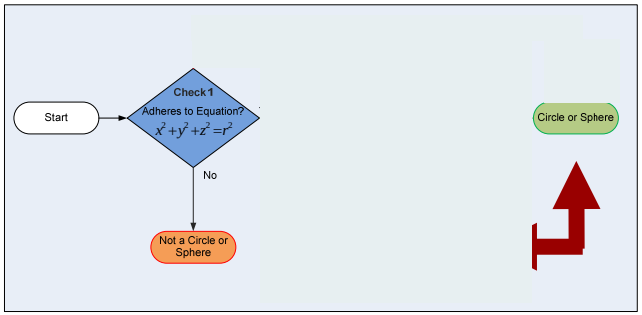


Science, Models, and Paradigms

The proof fails because the transformation equations do not produce a sphere in the second system since the points do not all have the same radius.



False Positive

Step 1

Values in K			
x	y	z	R
1	0	0	1
0	1	0	1
0	0	1	1
-1	0	0	1
0	-1	0	1
0	0	-1	1

Step 2

Transformation Equations

$$\xi = \frac{x - vt}{\sqrt{1-\frac{v^2}{c^2}}}, \eta = y, \varsigma = z, \tau = \frac{t - \frac{vx}{c^2}}{\sqrt{1-\frac{v^2}{c^2}}}$$

Step 3

Values in K' (v=100,000)			
ξ	η	ς	R'
0.999666722	0	0	0.999666722
-0.000333333	1	0	1.000000056
-0.000333333	0	1	1.000000056
-1.000333389	0	0	1.000333389
-0.000333333	-1	0	1.000000056
-0.000333333	0	-1	1.000000056

Not A Sphere

☑ All Values Conform To $x^2 + y^2 + z^2 = c^2t^2$

☑ All Values Maintain Same Radius? Yes, |**r**|=1

Note: R=ct

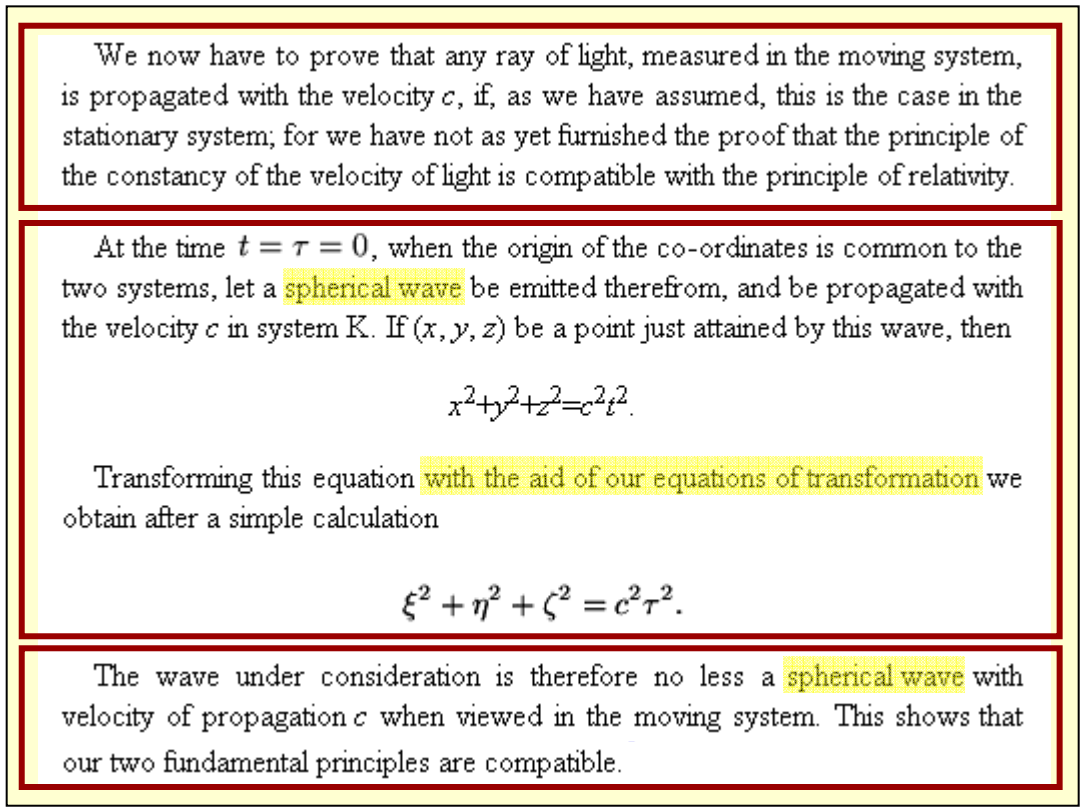
☑ All Values Conform To $\xi^2 + \eta^2 + \varsigma^2 = c^2\tau^2$

☒ All Values Maintain Same Radius? No, |**r**|>1

Note: R'=cτ

The Spherical Wave Proof Fails

The proof fails because the points do not maintain the same radius and we have incorrectly accepted the validity of Relativity Theory based on the *False Positive* result of the proof.



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☑ Claim

⚠ Math Proof (Incomplete)

- ✓ Satisfies Equations? Yes.
- ✘ Keeps Same Radius? No.

☒ Conclusion

Science, Models, and Paradigms

The “Logical Argument” pre-quiz:

You are moving at 10 miles per hour and have been traveling for some number of hours (e.g. 2 hours). Which of the following is used to measure the product of your Velocity multiplied by the amount of Time you’ve been traveling?

1. A Ruler
2. A Clock
3. A Scale
4. A Bucket

Science, Models, and Paradigms

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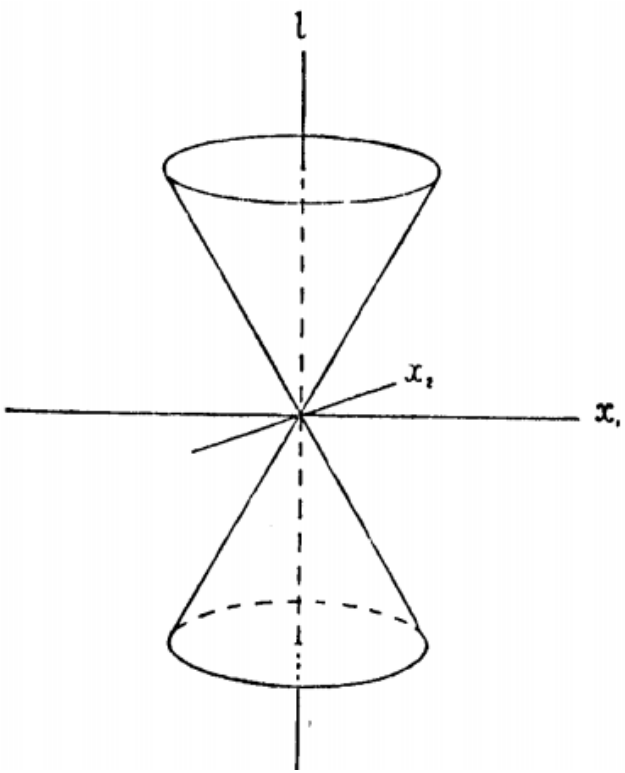
1. A Ruler
2. A Clock
3. A Scale
4. A Bucket

*This Answer is: A Ruler, because a Velocity multiplied by a Time is **always** a Distance. In a moment, some people will change their answer to A Clock…*

Science, Models, and Paradigms

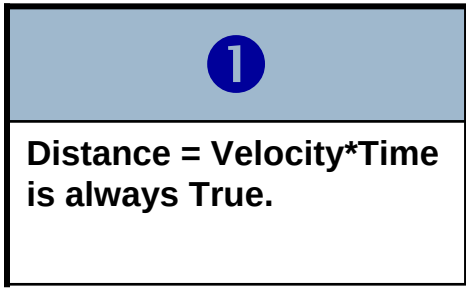
The Hypercone argument is an example of why logical, rational arguments do not always prevail over an existing belief system.



This is a Hypercone. Notice the vertical axis is labeled with the variable l.

Science, Models, and Paradigms

The variable *l* is created as a variable of convenience that is then mistreated as a Time rather than a Distance throughout the remainder of Einstein's Hypercone derivation and interpretation.



Science, Models, and Paradigms

The variable *l* is created as a variable of convenience that is then mistreated as a Time rather than a Distance throughout the remainder of Einstein's Hypercone derivation and interpretation.

❶	❷
Distance = Velocity*Time is always True.	**Einstein treats the Hypercone variable *l* as Time.**

1. *"At the definite K **time, l=0**…"*
2. *"A **clock** at rest…, whose beats are characterized by **l=n**…"*
3. *"…the **clock** goes slower…"*

Science, Models, and Paradigms

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❶	❷	❸
Distance = Velocity*Time is always True.	**Einstein treats the Hypercone variable *l* as Time.**	**Mathematically, *l* is defined as the speed of light multiplied by time.**

1. *"At the definite K **time, l=0**…"*
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*"…we shall introduce the light-time **l=ct**, in place of time t, in order that the constant c shall not enter explicitly into the formula to be developed later."*

Science, Models, and Paradigms

The variable *l* is created as a variable of convenience that is then mistreated as a Time rather than a Distance throughout the remainder of Einstein's Hypercone derivation and interpretation.

❶	❷	❸	❹
Distance = Velocity*Time is always True.	**Einstein treats the Hypercone variable *l* as Time.**	**Mathematically, *l* is defined as the speed of light multiplied by time.**	**The Hypercone variable *l* is actually a Distance.**

1. *"At the definite K **time, l=0**…"*
2. *"A **clock** at rest…, whose beats are characterized by **l=n**…"*
3. *"…the **clock** goes slower…"*

*"…we shall introduce the light-time **l=ct**, in place of time t, in order that the constant c shall not enter explicitly into the formula to be developed later."*

Although *l* is Distance, some people will find a way to accept it as a measure of Time, measured using a clock, in order to maintain their beliefs.

People will defend their beliefs, even in the face of overwhelming evidence.
Kevin Hogan, author of The Psychology of Persuasion

Science, Models, and Paradigms

New models can replace existing models only when…

1. The new model explains things in a more intuitive manner and produce better mathematical results

2. The new model is supported by a group of people expert in the new **and** who are also recognized as being expert in the old model

Our goal today is to make progress in both of these areas.

Part 2

INTRODUCING MODERN CLASSICAL MECHANICS

The Twin Paradox: Why it is required by Relativity
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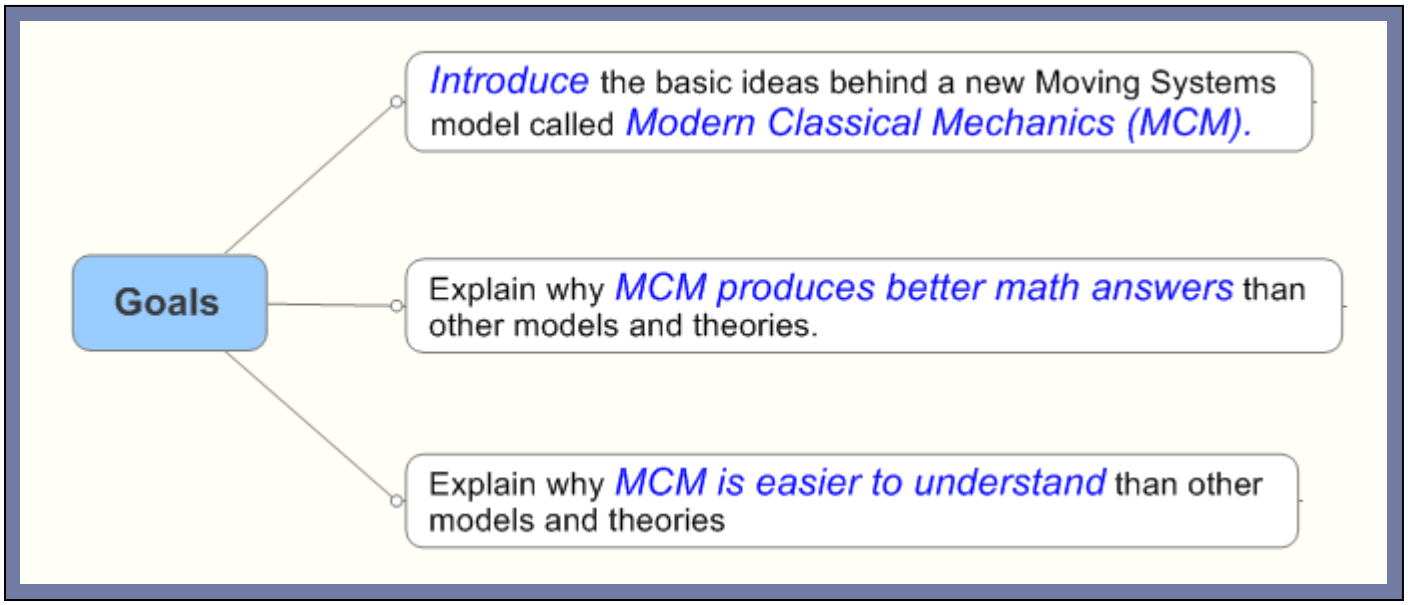
Introducing Modern Classical Mechanics

Introduce **Modern Classical Mechanics** and show why it is more **intuitive**, gives **better answers**, and **explains more** about the "established" theories than those "established" theories do themselves.



*The MCM model makes it easier to understand why **Relativity Theory requires Time Dilation, Length Contraction, and the Twin Paradox**.*

Introducing Modern Classical Mechanics

Modern Classical Mechanics is an intuitive, easy to understand model that produces more accurate results than other models.

1. A **System** is a 1-, 2-, or 3-dimensional **spatial coordinate system** that is defined by its boundaries, its internal propagation medium, or both.
2. **A System can be placed entirely on (or in) a previously placed system**.
3. A System moves with respect to, or relative to, the system on (or in) which it is placed.
4. A System observed by its boundaries can be thought of as a **Particle**, while a System observed by its propagation medium can be thought of as a **Wave.**

*There is one key concept, which is called a **System**.*

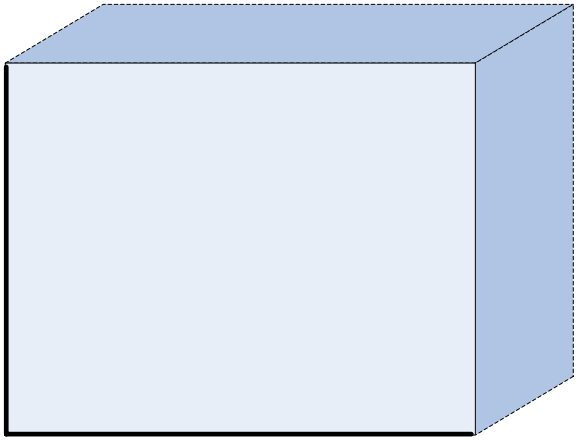
Introducing Modern Classical Mechanics

Systems exist as 1, 2, or 3 dimensional **spatial coordinate systems**.

Line
1 Dimensional
Coordinate System

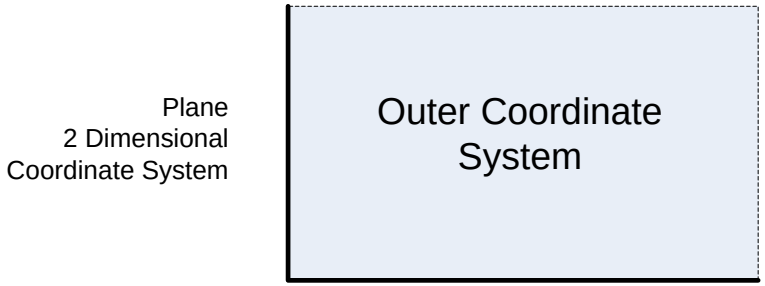
Plane
2 Dimensional
Coordinate System

Space
3 Dimensional
Coordinate System



Introducing Modern Classical Mechanics

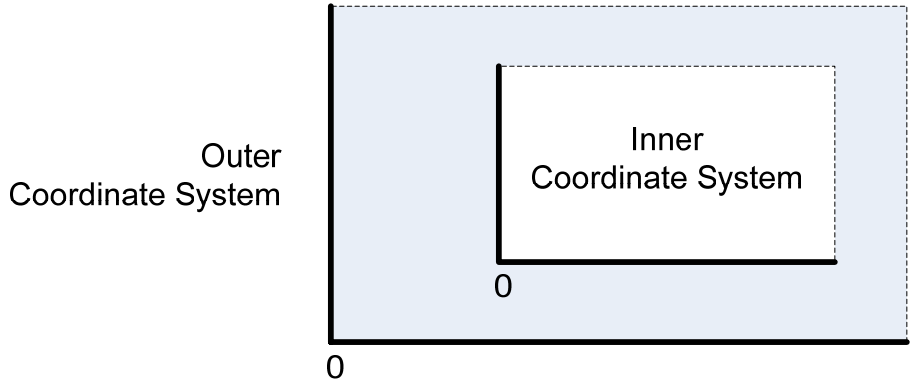
Systems that other systems are placed on or in are more specifically called **Outer Systems**.



An Outer System, by itself, is rather uninteresting.

Introducing Modern Classical Mechanics

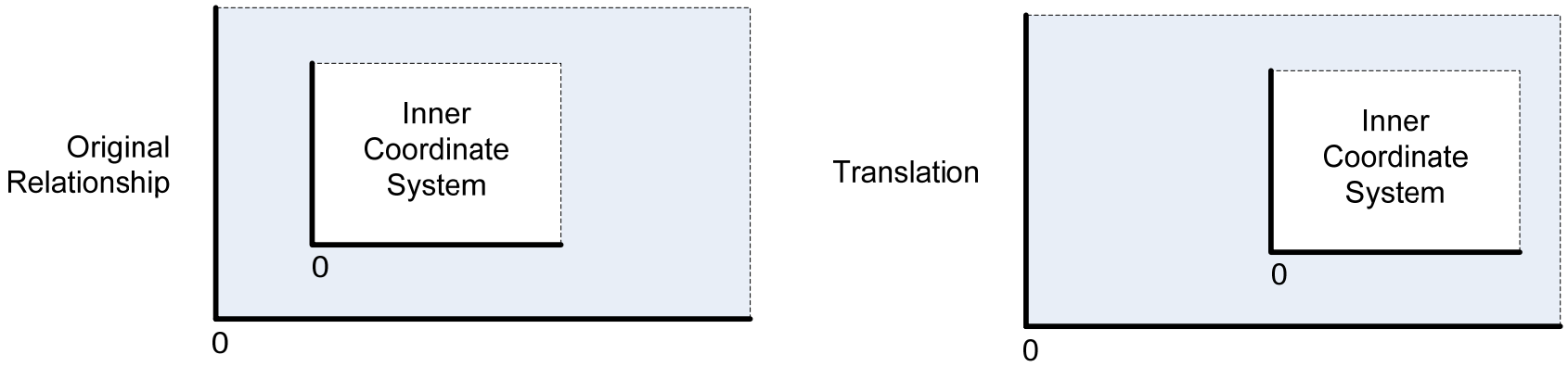
Systems that are placed on or in other systems are more specifically called **Inner Systems**.



Inner Systems *are very interesting because they can* ***move****.*

Introducing Modern Classical Mechanics

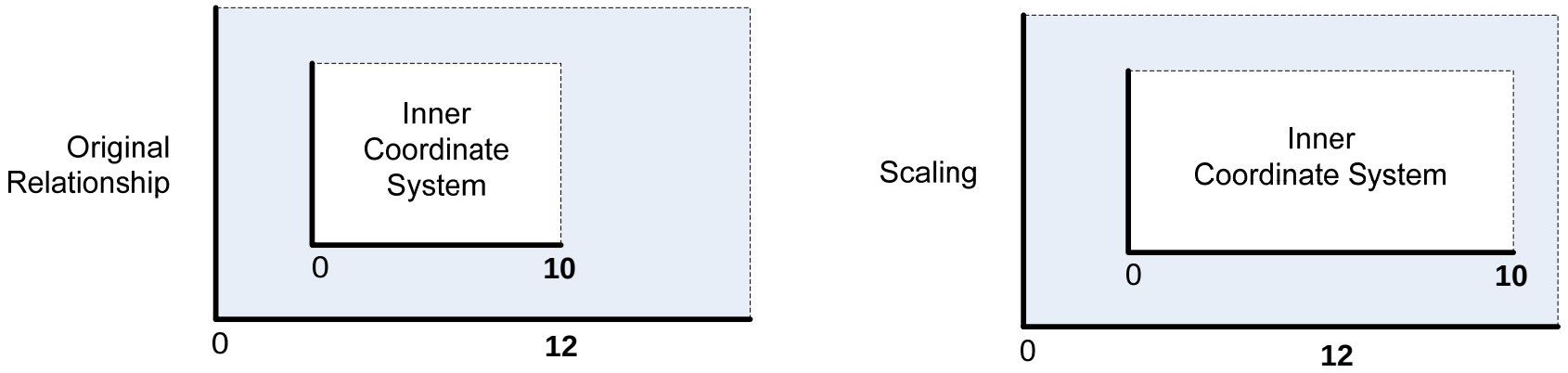
An Inner System can **Slide**, which we call **Translation**.



From the perspective of the Outer System, the Inner System has slid to a new position. From the perspective of the Inner System, nothing has changed.

Introducing Modern Classical Mechanics

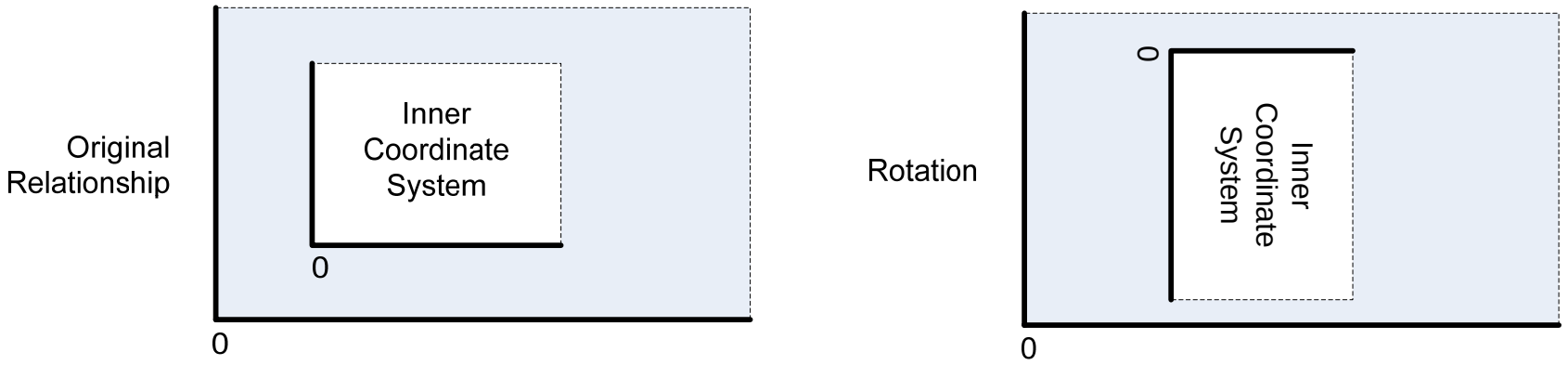
An Inner System can **Stretch**, which we call **Scaling**.



From the perspective of the Outer System, the Inner System has stretched and has new length. From the perspective of the Inner System, nothing has changed.

Introducing Modern Classical Mechanics

An Inner System can **Turn**, which we call **Rotation**.



From the perspective of the Outer System, the Inner System has rotated to face another direction. From the perspective of the Inner System, nothing has changed.

Introducing Modern Classical Mechanics

An Inner System can **Flip**, which we call **Reflection**.

From the perspective of the Outer System, the Inner System has flip along one axis. From the perspective of the Inner System, nothing has changed.

Introducing Modern Classical Mechanics

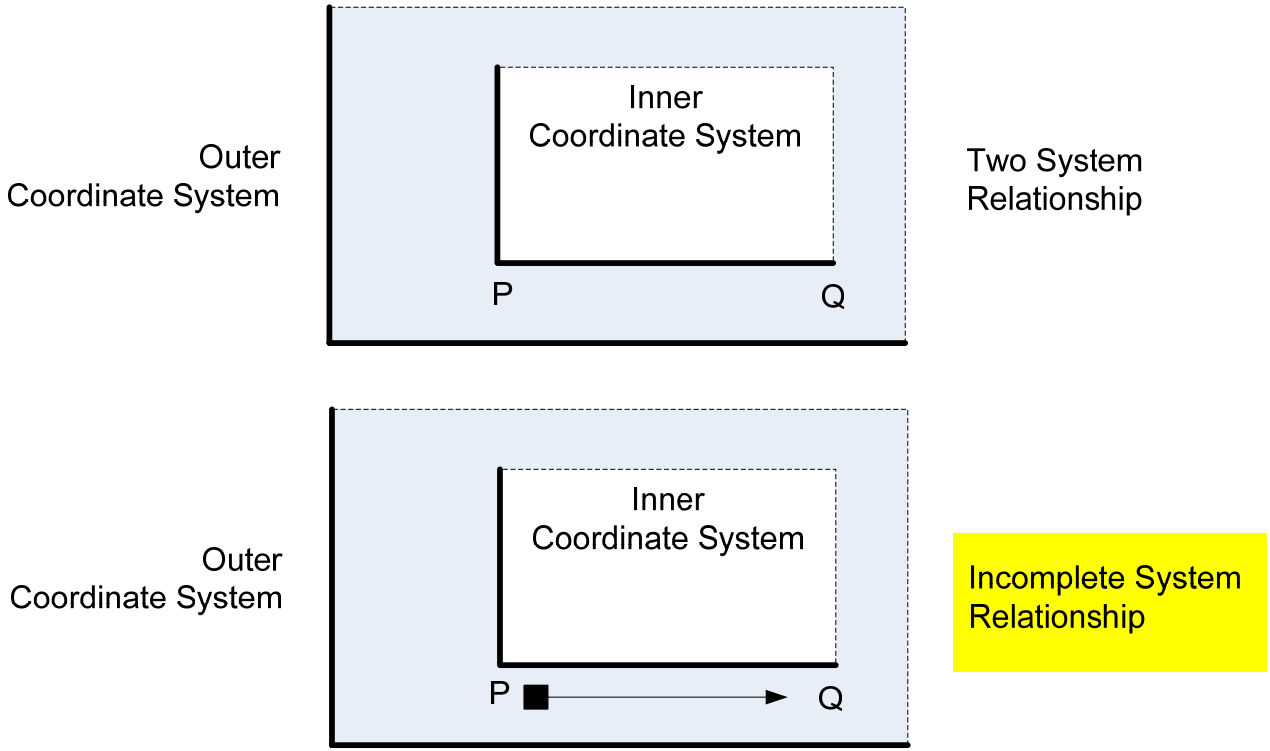
The basic Modern Classical Mechanics operations of Translation, Scaling, Rotation, and Reflection are all intuitive types of **Transformations**, which are described by mathematical equations.

Transformation Type	Mathematical Operation	Characteristics
Translation	Addition or Subtraction	▸ Same Size and Shape ▸ Different Position ▸ Different Distance from Origin ▸ Same Orientation
Scaling	Multiplication or Division	▸ Different Size and/or Shape ▸ Same Position ▸ Same Distance from Origin ▸ Same Orientation
Rotation	Trigonometric Operations	▸ Same Size and Shape ▸ Different Orientation ▸ Possible Different Position ▸ Same Distance from Origin
Reflection	Addition or Subtraction or Absolute Values	▸ Same Size and Shape ▸ Different position, reflected around a point or axis

*Some Transformations are best performed when the Inner System is located at the **Origin** of the Outer System.*

Introducing Modern Classical Mechanics

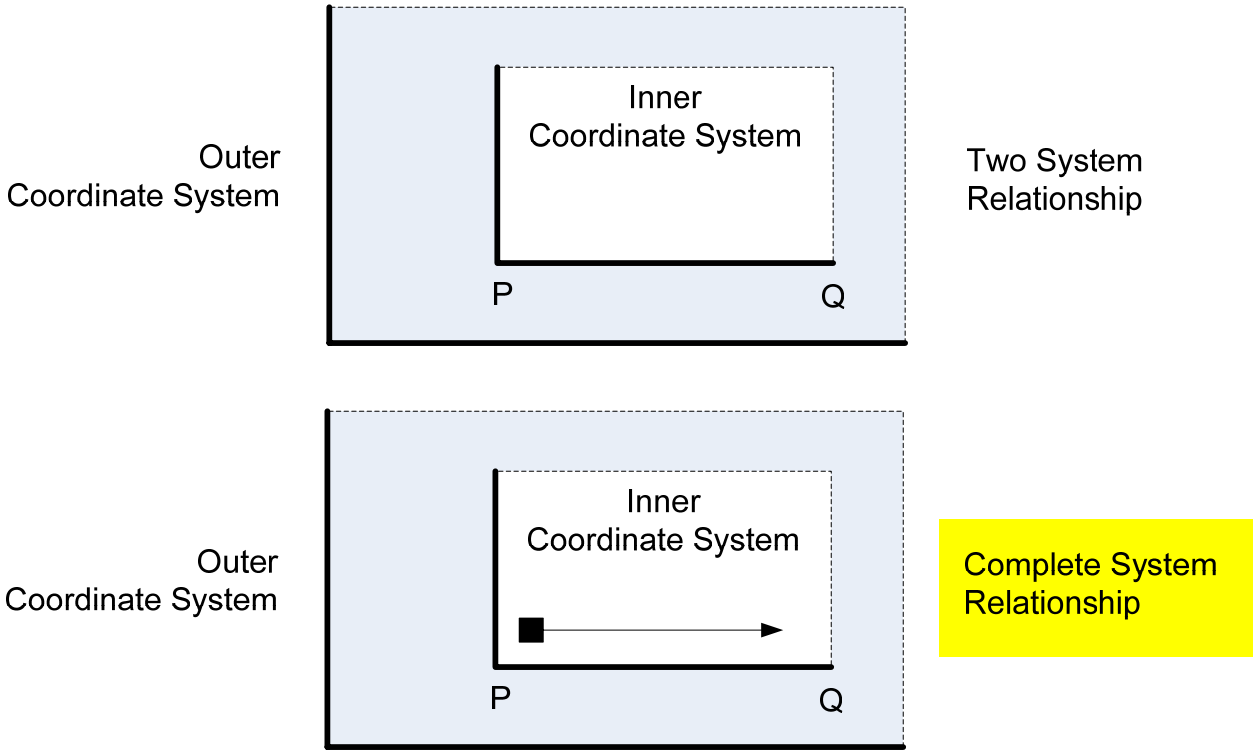
When a **third System** is placed, it can be placed on (or in) the Outer-most System, creating **non-nested** Inner System to Outer System relationships.



*The systems are referred to as the **Outer System**, the **Inner System**, and the **Moving Phenomena**, in a 3-component system.*

Introducing Modern Classical Mechanics

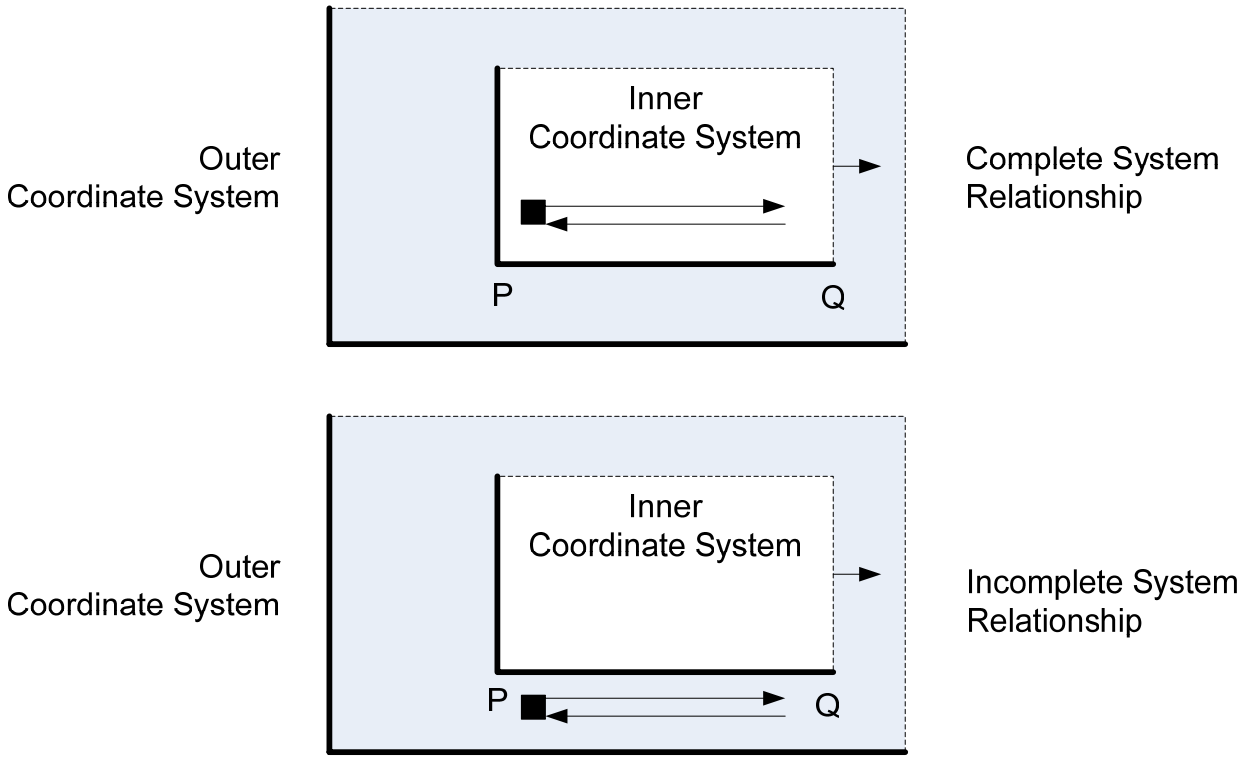
Alternatively, a third System can be placed on (or in) a previously placed Inner System, creating **nested** Inner System to Outer System relationships.



Beware: There will be cases where some relationship that appear nested are actually non-nested.

Introducing Modern Classical Mechanics

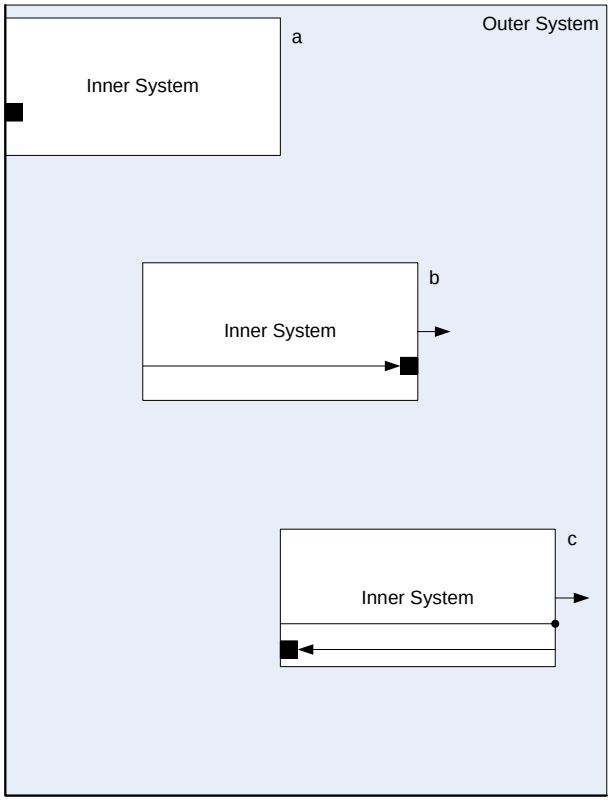
The interesting case occurs when the Moving Phenomena goes back and forth, or **oscillates,** with respect to the Inner System.



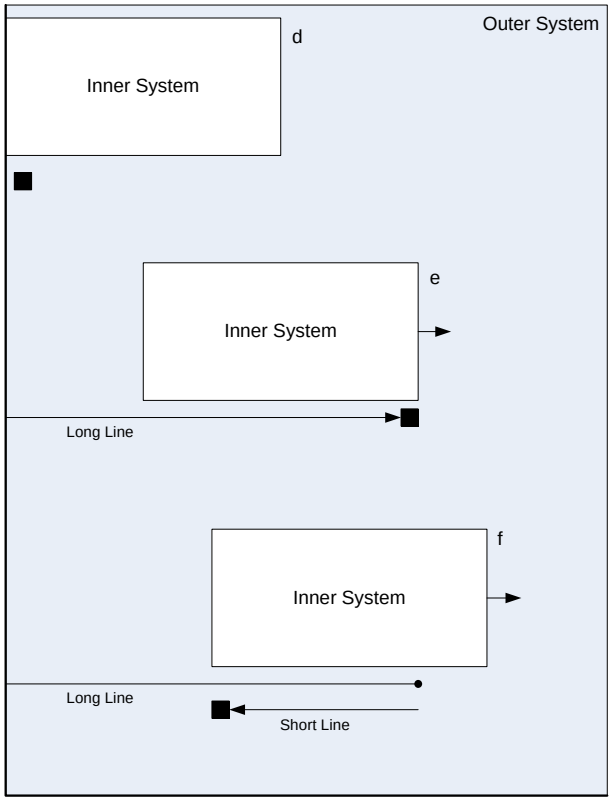
*Notice that we need to mathematically describe the movement of the Inner System **and** the Moving Phenomena.*

Introducing Modern Classical Mechanics

In both a Complete and an Incomplete System Relationship where the Moving Phenomena behaves like a **Particle**, its oscillating behavior is easy to describe in terms of **Length**.



Complete System Relationship
Symmetric Oscillation

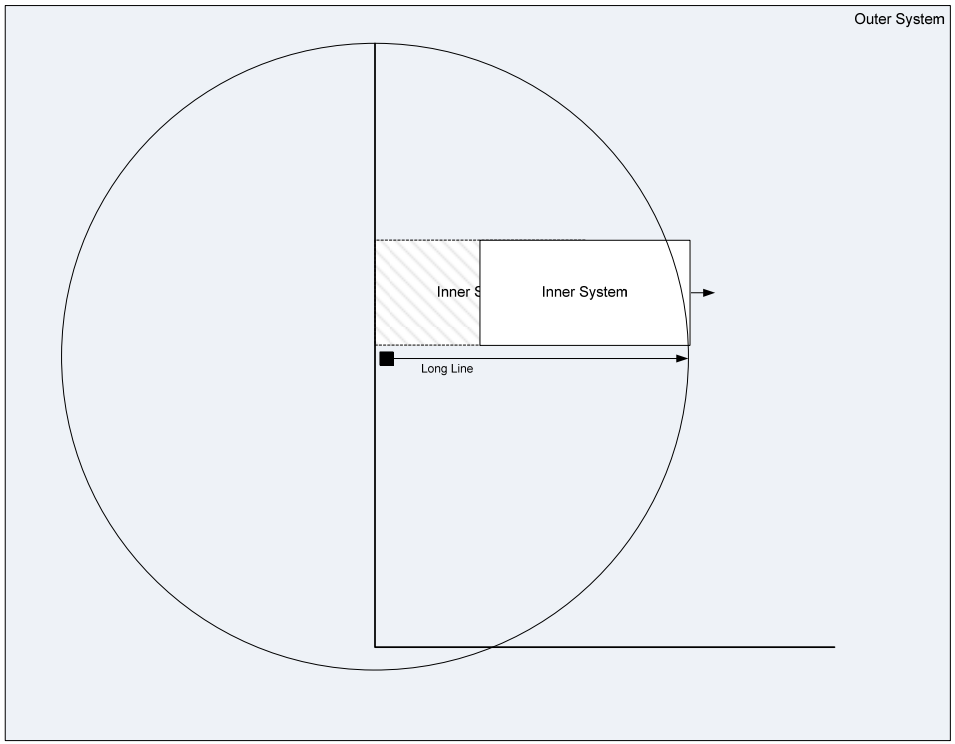


Incomplete System Relationship
Asymmetric Oscillation

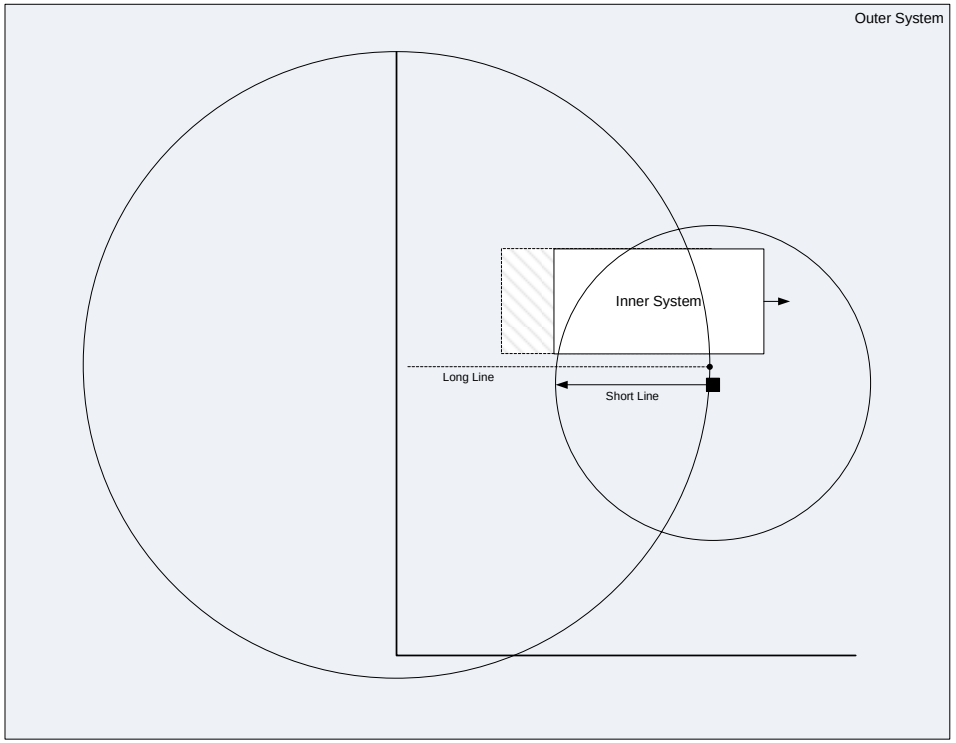
*Mathematically, the oscillation behavior of a Particle's **Length** is defined using **addition**.*

Introducing Modern Classical Mechanics

In a Incomplete System Relationship, the Moving Phenomena can move like **Waves** with respect to the Outer System, with its oscillating behavior described in term of **Wavelength**.



Incomplete System Relationship
Wave Asymmetric Oscillation



Incomplete System Relationship
Wave Asymmetric Oscillation

*Mathematically, the oscillation behavior of a Wave's **Wavelength** is defined using an **Average**. Notice the **Asymmetry** of the oscillation.*

Introducing Modern Classical Mechanics

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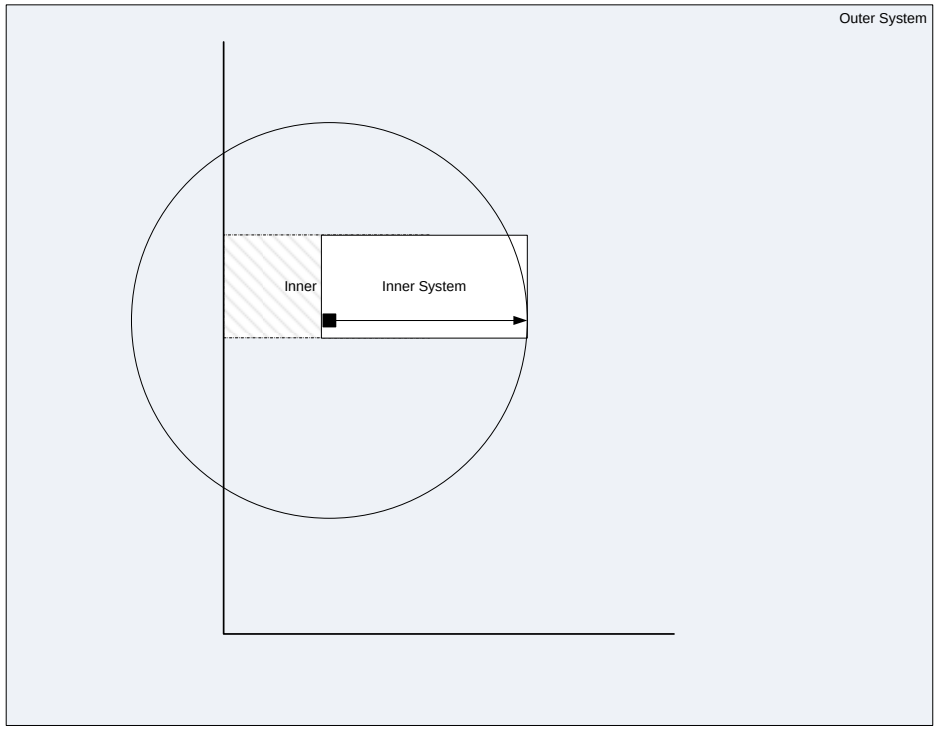
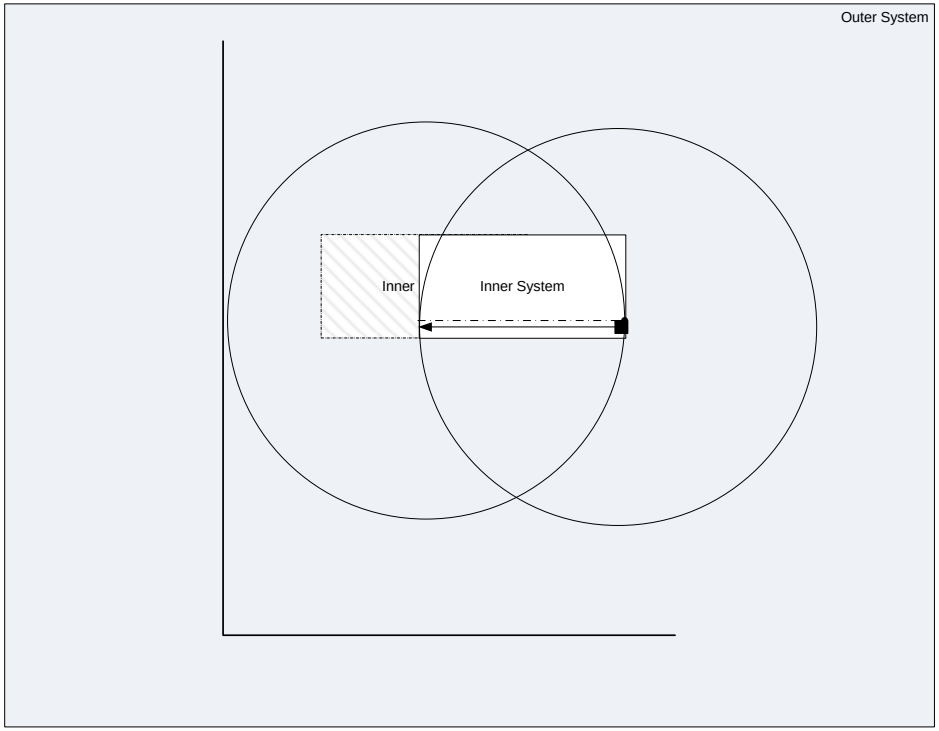


Complete System Relationship
Wave Asymmetric Oscillation

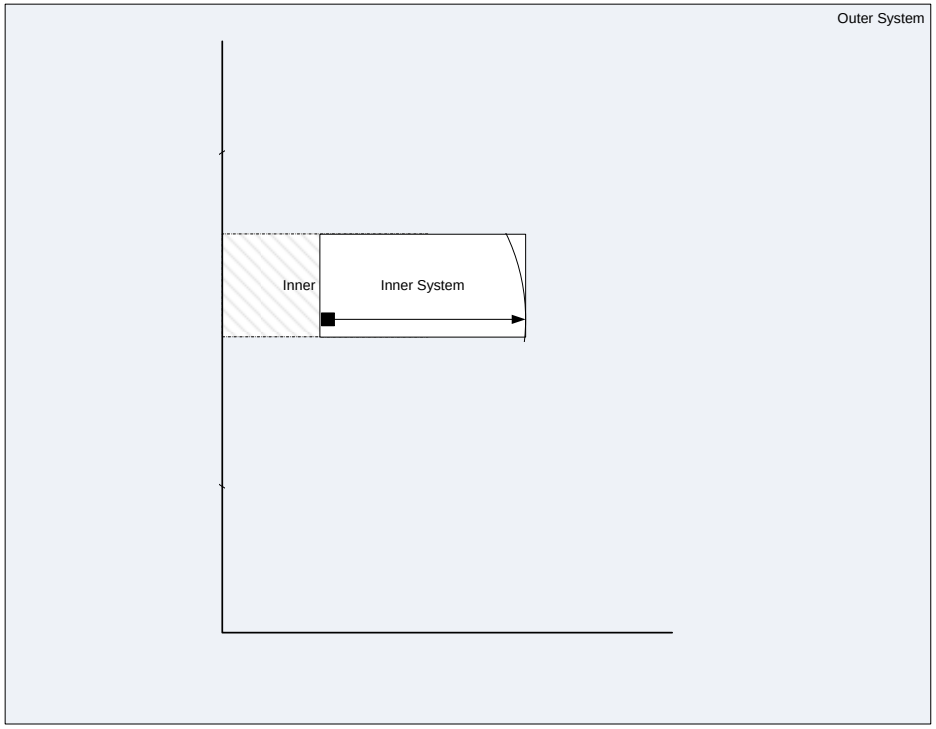


Complete System Relationship
Wave Asymmetric Oscillation

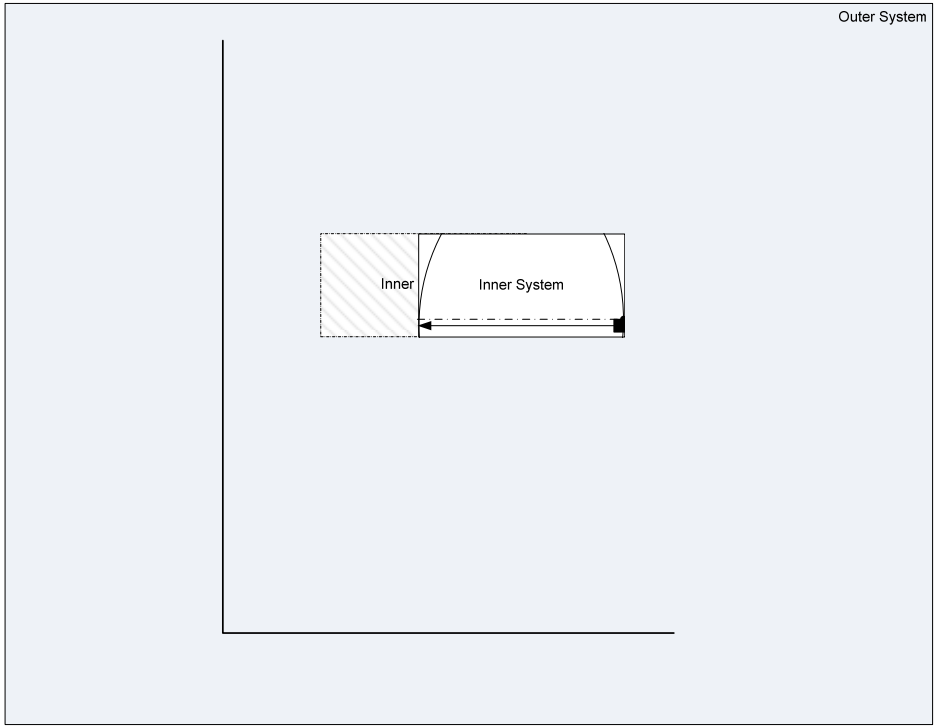
*A Complete System Relationship differs from an Incomplete System Relationship in that the Wave moves with respect to Inner System's medium instead of the Outer System's medium. Notice the **Symmetry** of the oscillation.*

Introducing Modern Classical Mechanics

Technically, in a Complete System Relationship, the waves in the Inner System do not readily propagate outside of that Inner System.



Complete System Relationship
Wave Asymmetric Oscillation



Complete System Relationship
Wave Asymmetric Oscillation

Introducing Modern Classical Mechanics

The Modern Classical Mechanics of 3-component interactions for waves and particles are easily summarized using two scenarios

1. A **Bus** (Inner System) is moving along a street (Outer System). You (Particle) must press a button on the rear of the bus, then press a button at the front of the bus, and then repeat your actions (Oscillation). You can walk along side the bus on the street (non-nested, Incomplete System Relationship), or you can walk on the aisle in the bus (nested, Complete System Relationship). Mathematically, we describe the motion of the bus (using classical mechanics) and your motion (using length-based equations).

2. A **Boat** (Inner System) with several inches of water in the bottom (Inner System medium) is moving along a still river (Outer System and Medium). You slap your hand in the water, which makes a Wave. When the wave reaches your friend in the front of the boat, she slaps her had. When her wave reaches you, you repeat your action (Oscillation). You can perform this by slapping the water in the river (non-nested, Incomplete System Relationship), or you can slap the water that in in the boat with you and your friend (nested, Complete System Relationship). Mathematically, we describe the motion of the boat (using classical mechanics) and your waves (using wavelength-based equations).

Use this page for future reference…

RELATIVITY CHALLENGE

Part 3

INTRODUCING MODERN CLASSICAL MECHANICS

The Twin Paradox: Why it is required by Relativity
The Failure of the Relativistic Hypercone

(co-authored with Glenn Borchardt)

18th Annual NPA Conference
University of Maryland, Baltimore Maryland
July 6 – July 9, 2011

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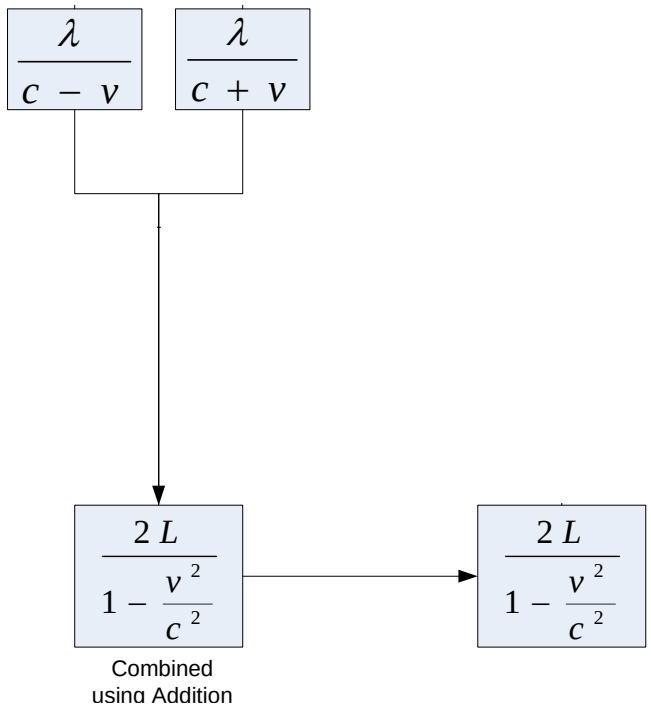
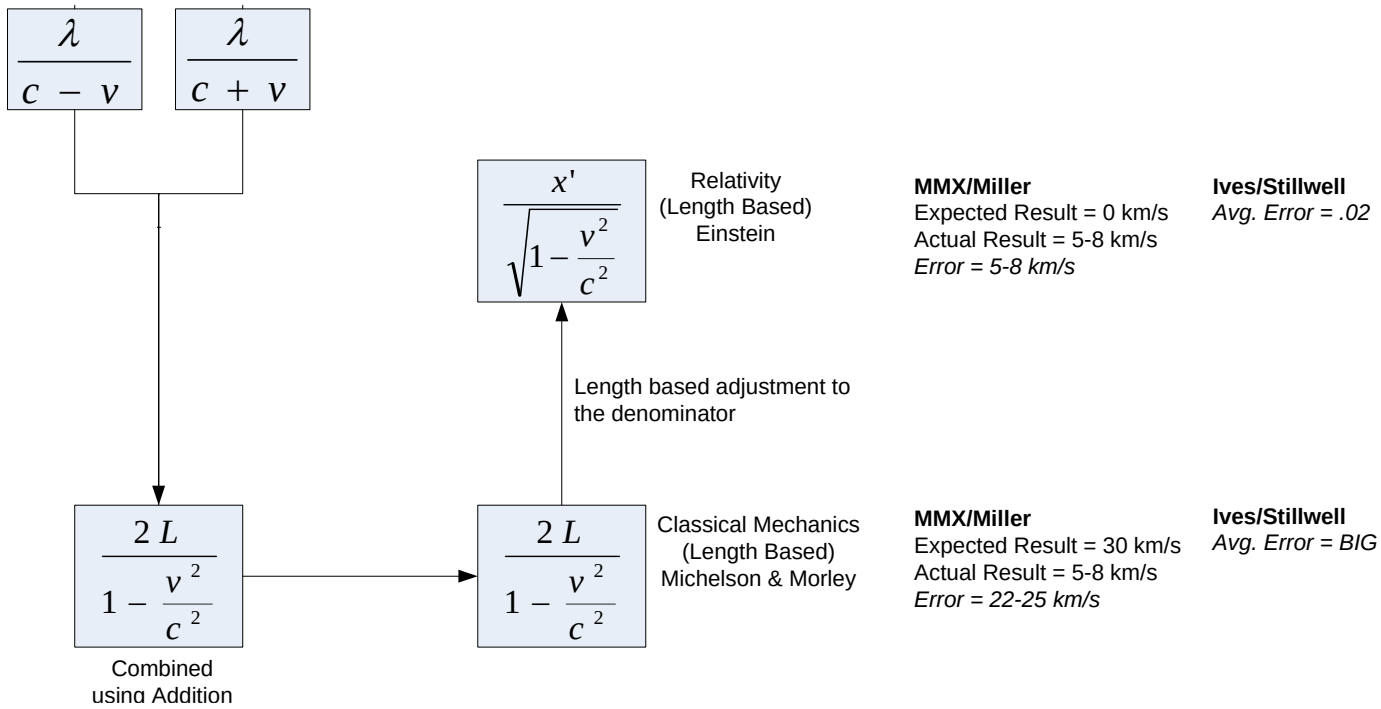
Experimental Accuracy

The experiments, like Michelson-Morley, were analyzed using length-based equations, as would be appropriate for the motion of Particles; these equations did not produce accurate answers.



Experimental Accuracy

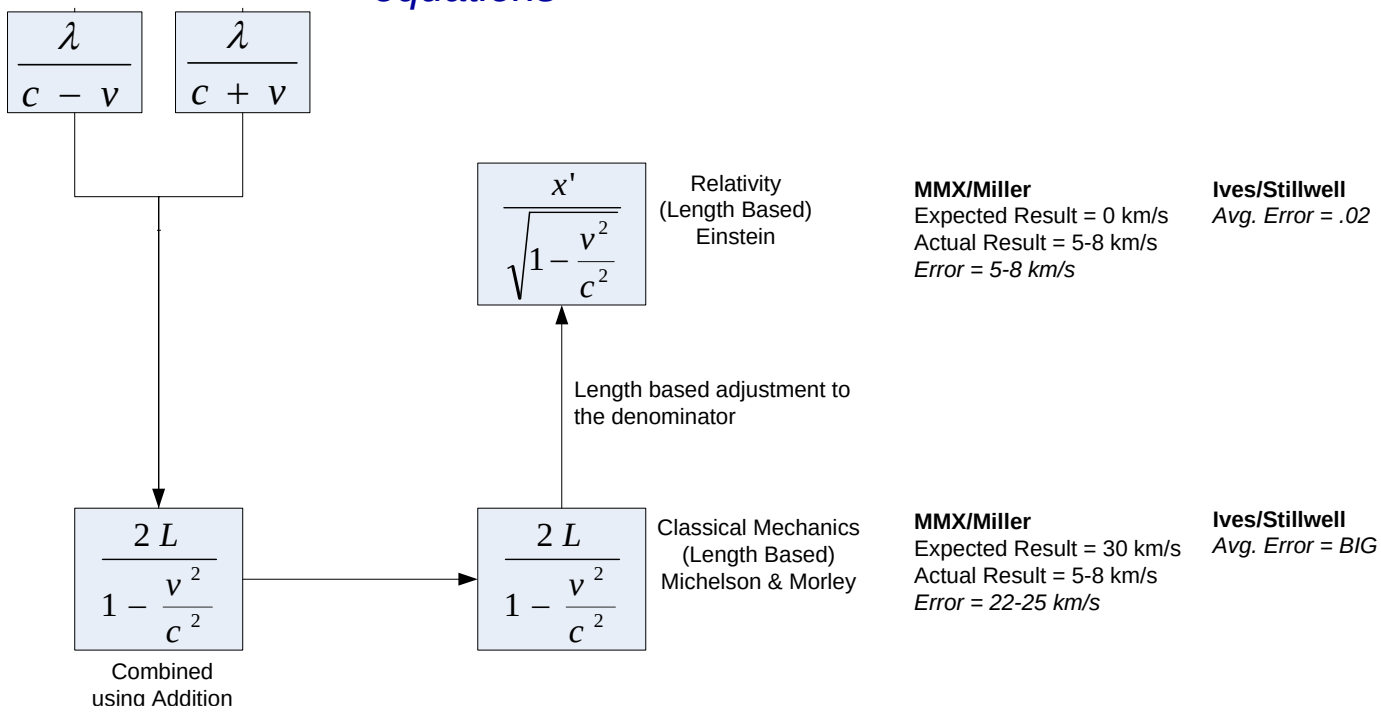
Lorentz (and others) made a length-based correction to produce equations that yield much better answers.



Experimental Accuracy

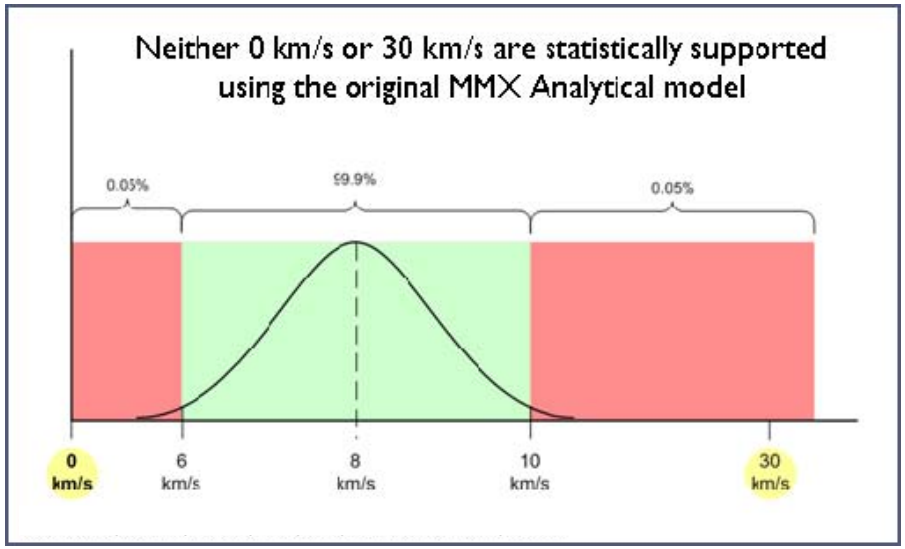
Lorentz (and others) made a length-based correction to produce equations that yield much better answers.

The corrected Lorentz / Einstein equations produce really good results; much more accurate results for wavelength-based observations and experiments than the "unadjusted" length-based equations



Experimental Accuracy
The Michelson-Morley Experiment

Original Algorithm



- Lorentz wanted to explain the failure to get 30 km/s
- SRT requires that the measured results are attributed to "experimental error"
- Interpreted as measuring "**null**" or 0 km/s
- No Experimental Convergence

Experimental Accuracy

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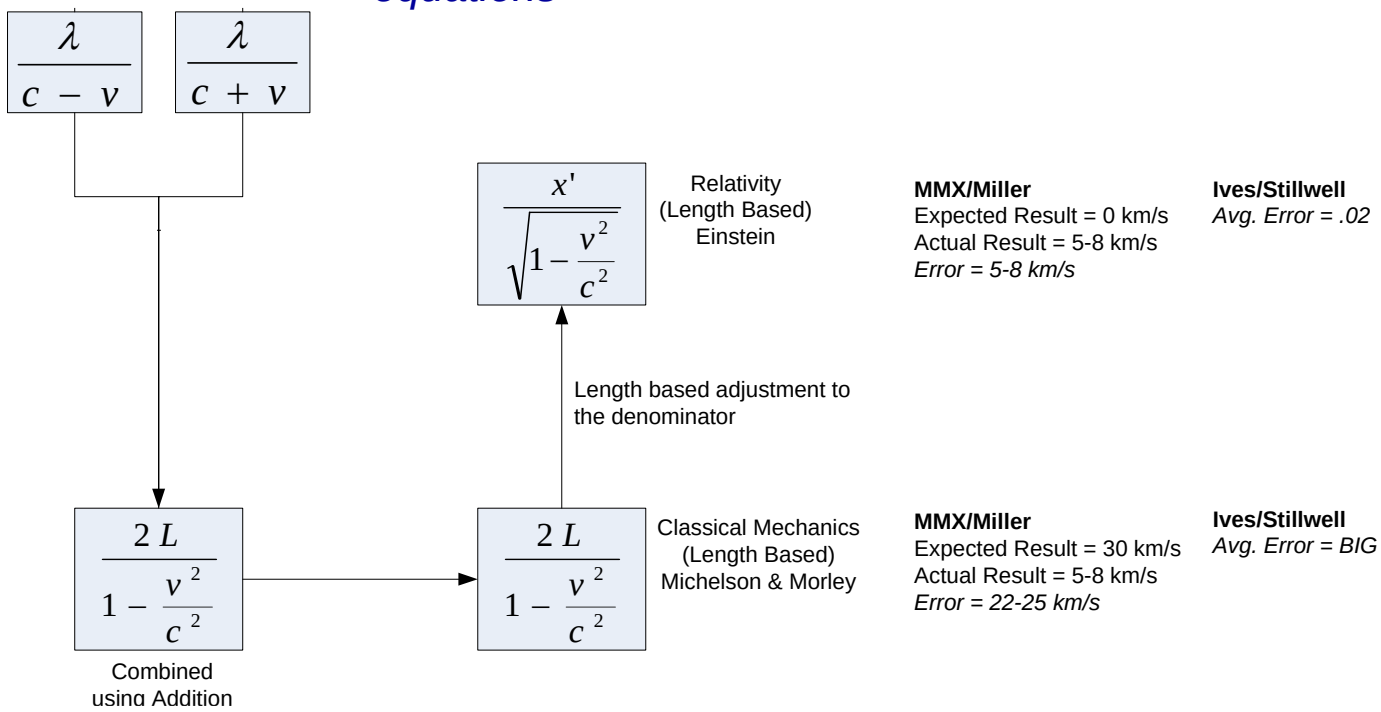
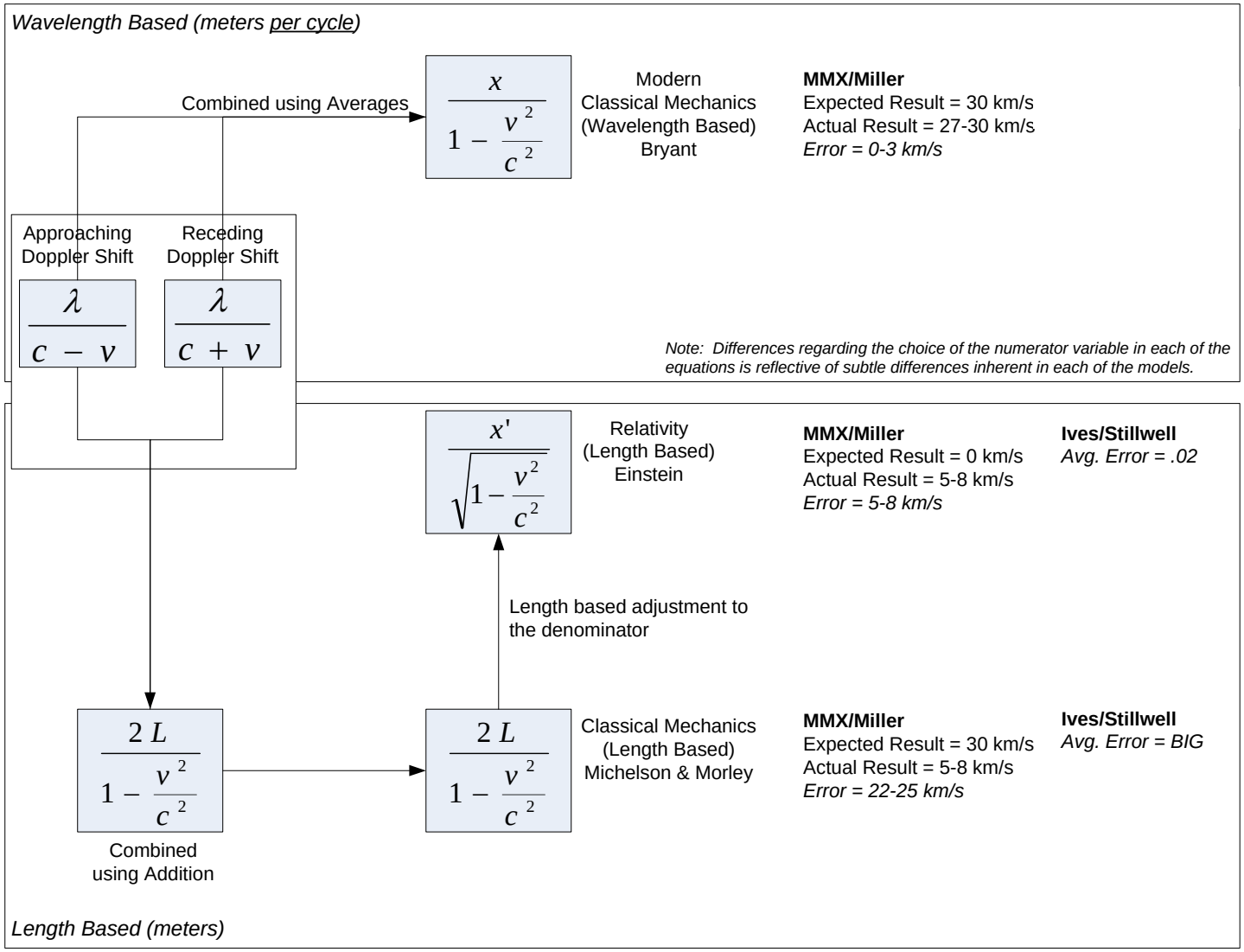


Experimental Accuracy

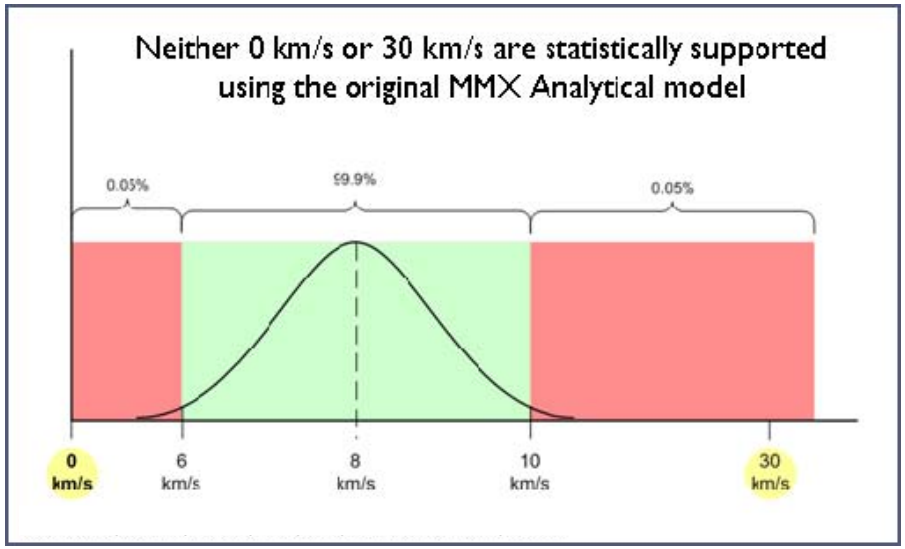
Wavelength-based equations and interpretations produce math results that are better than those from Lorentz's or Einstein's equations.



Experimental Accuracy
The Michelson-Morley Experiment

The revised equations incorporate our understanding of Wavelength and Length and statistically supports the expected result of 30 km/s.

Original Algorithm



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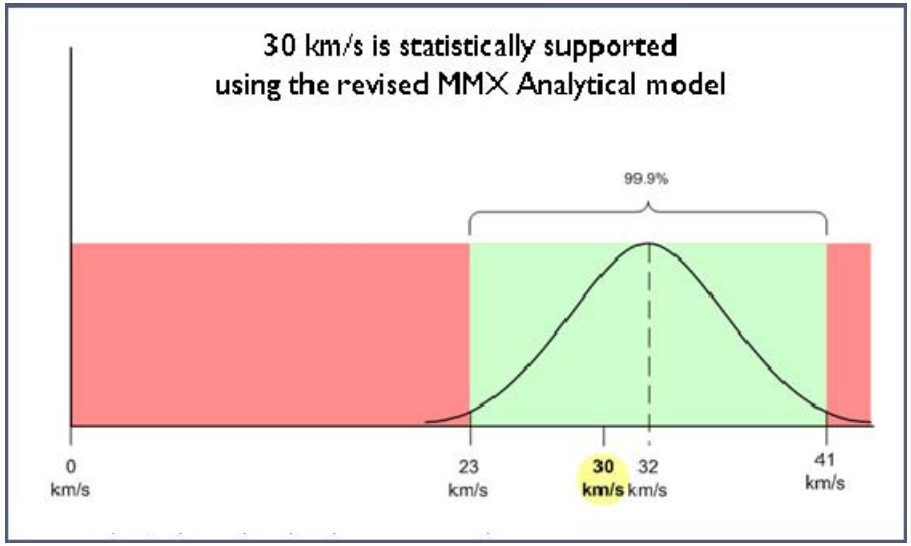
Revised Algorithm



- Distinguishes between Wavelength and Length Types
- Uses Wavelength versus Length Math Operations
- Aligns Expected Result Measurement Angle with Actual Result Measurement Angle
- 30 km/s is Statistically Supported
- Experimental Convergence with Miller 1933 - 30 km/s!

Experimental Accuracy
The Ives-Stillwell Atomic Clock Experiment

The revised algorithm predicts the Ives-Stillwell Atomic Clock experiment with **equal or greater accuracy** than the SRT equations.

Expected and Actual Results of the Doppler Displacement

#	Plate	Actual Result	Einstein Expected Result	Einstein Variance	REVISED Expected Result	REVISED Variance
1	169	10.35	10.3610	0.0110	10.3500	0.0000
2	160	14.02	14.0403	0.0203	14.0201	0.0001
3	163	15.40	15.4245	0.0245	15.4002	0.0002
4	170	16.49	16.5181	0.0281	16.4902	0.0002
5	165	14.07	14.0904	0.0204	14.0701	0.0001
6	172	18.67	18.7060	0.0360	18.6703	0.0003
7	172	15.14	15.1637	0.0237	15.1401	0.0001
8	177	21.37	21.4172	0.0472	21.3704	0.0004
--	**mean**	**15.69**	**15.7151**	**0.0264**	**15.6889**	**0.0002**

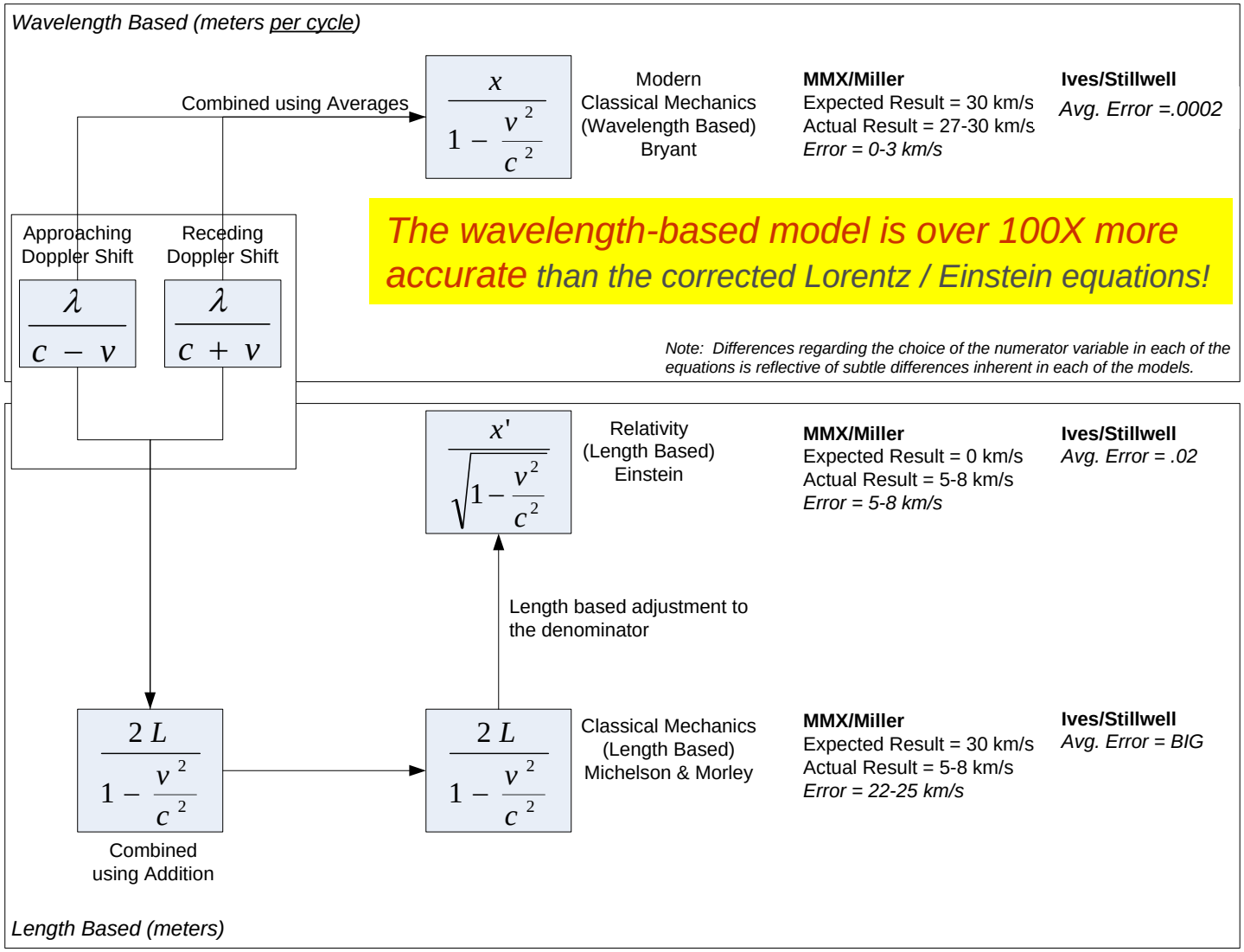
- **The Einstein-Lorentz equations produce close results with a small error of 0.02 to 0.03**, to the degree of accuracy of the experiment
- **The Modern Classical Mechanics based equations produce 0 error,** to the degree of accuracy of the experiment

Key Finding

Challenges the belief that SRT is the only predictor of the Ives-Stillwell experiment.

Experimental Accuracy

Wavelength-based equations and interpretations produce math results that are better than those from Lorentz's or Einstein's equations.



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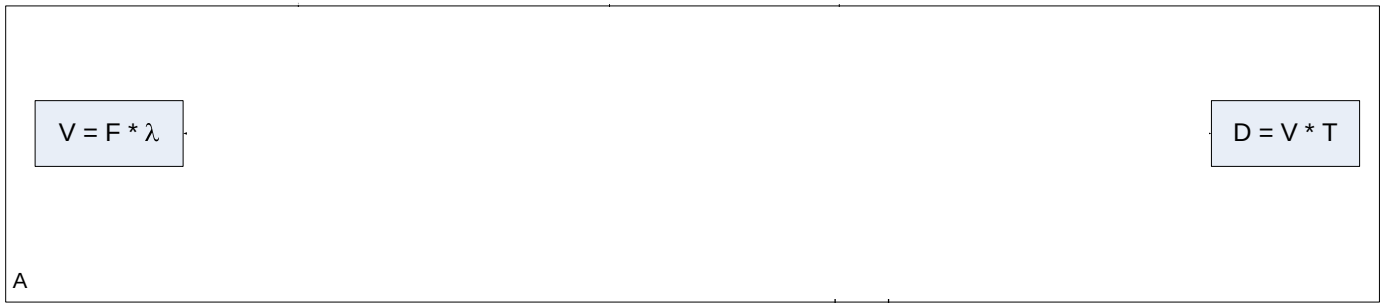
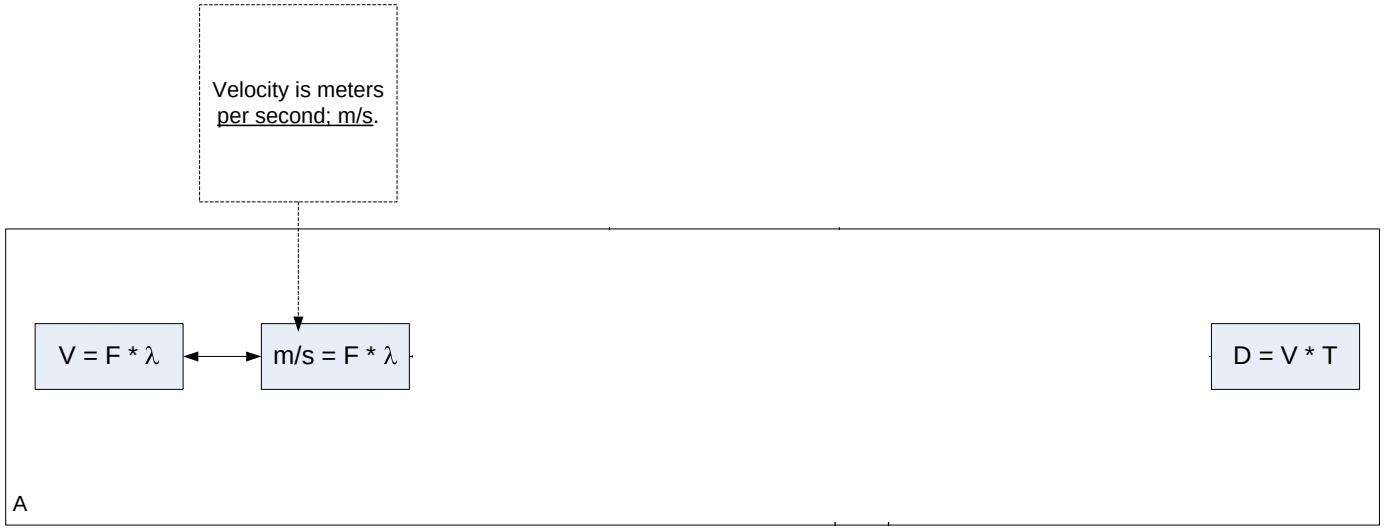
The Twin Paradox

The Wavelength equation and the Length equations. In a Length-based model, these two equations are treated as the same thing.



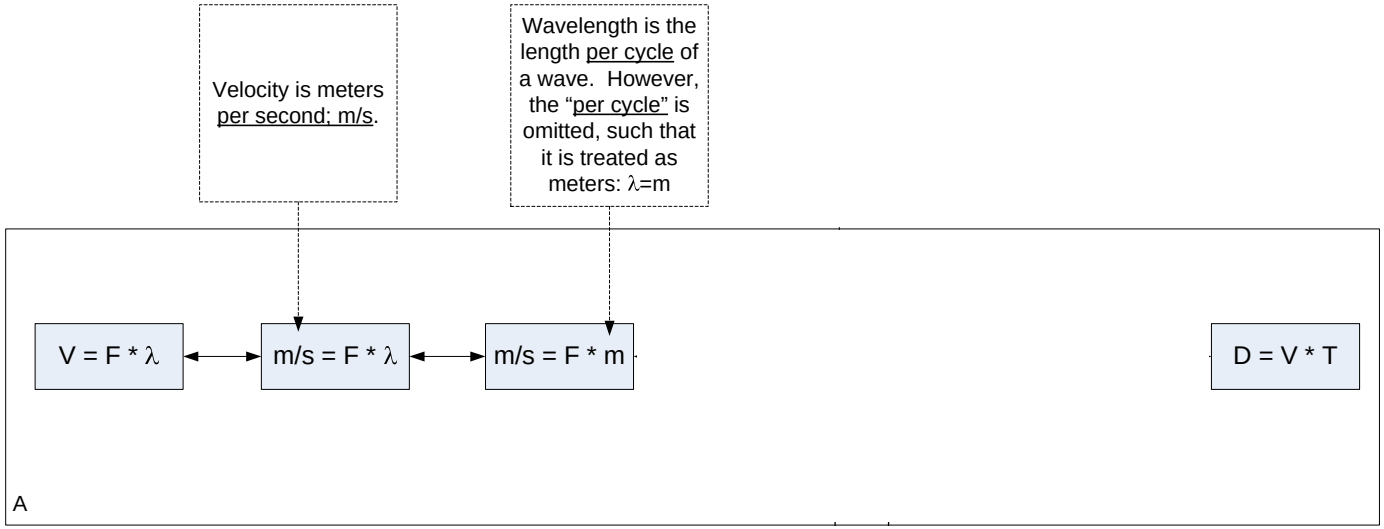
The Twin Paradox

Begin by substituting the units for the underlying Types, beginning with Velocity, which is replaced by meters per second.



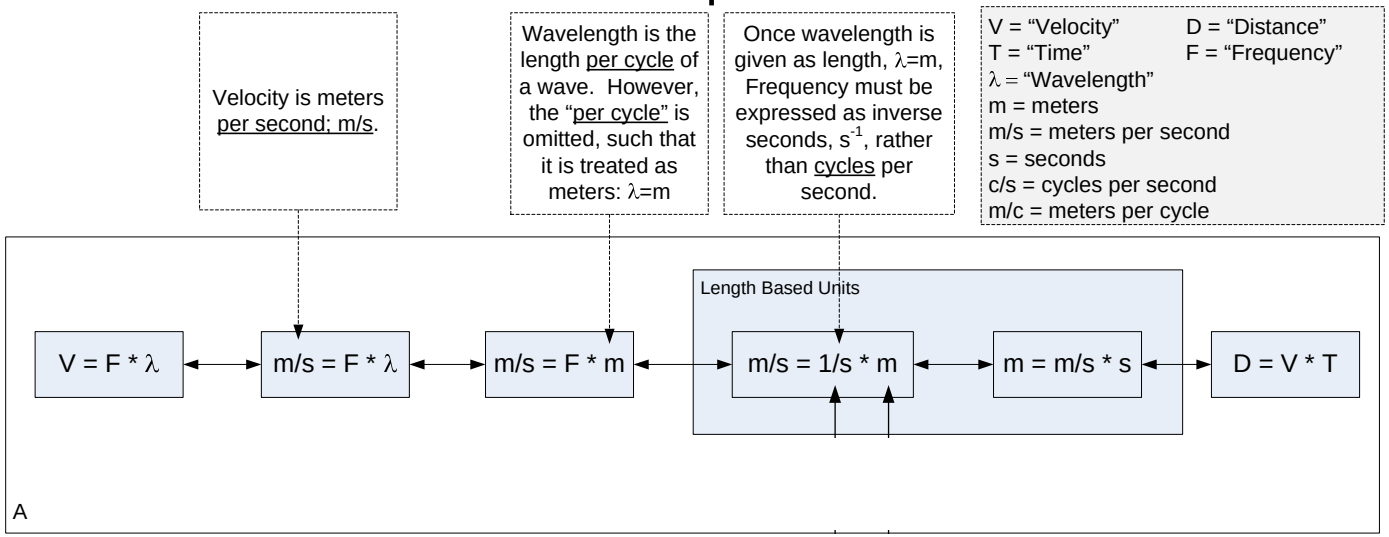
The Twin Paradox

While Wavelength is commonly stated as “meters per cycle”, it is mathematically treated as “meters.”



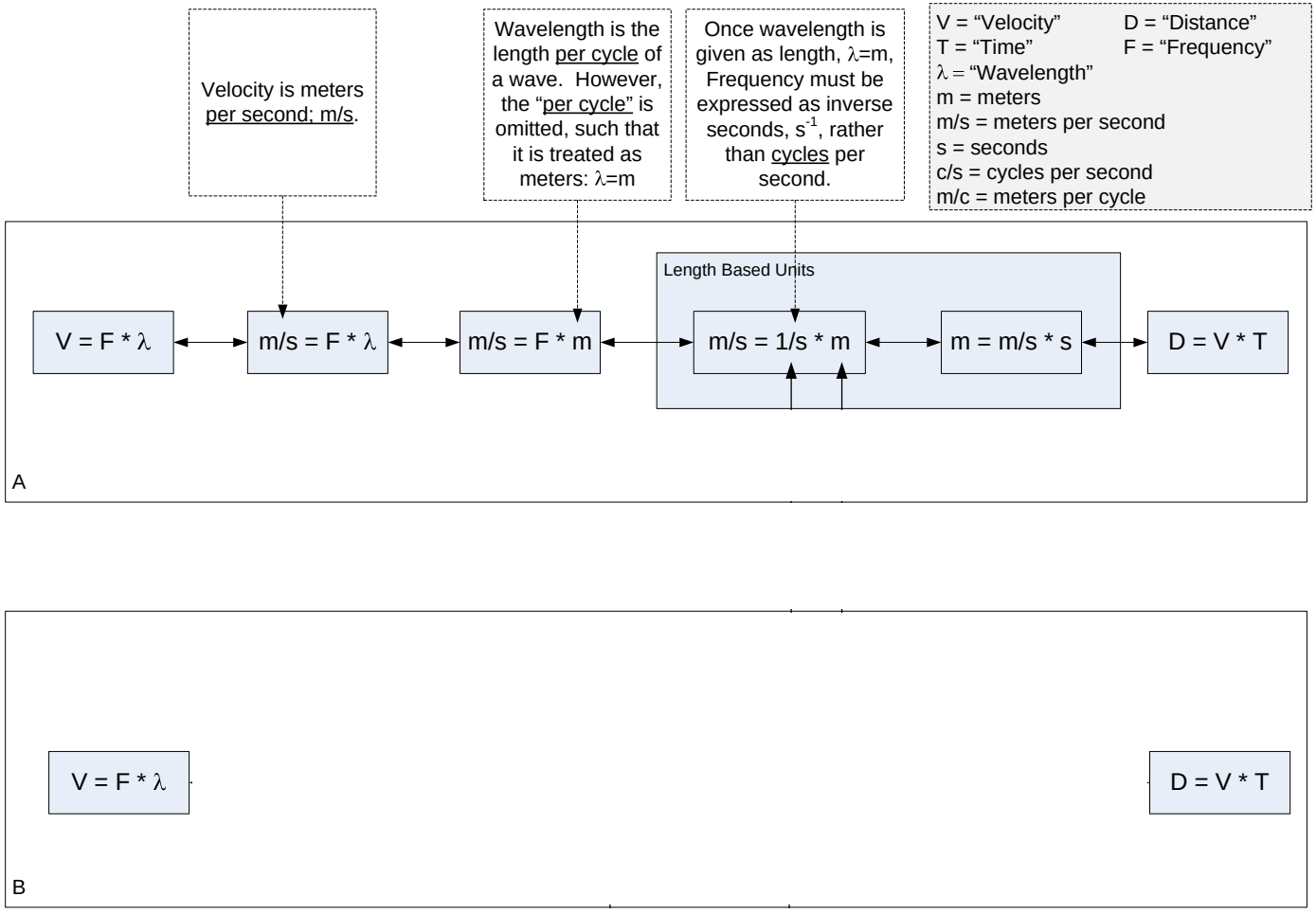
The Twin Paradox

With Wavelength stated as Meters, Frequency is commonly treated as inversed Seconds. We rewrite the equations to arrive at D=V*T.



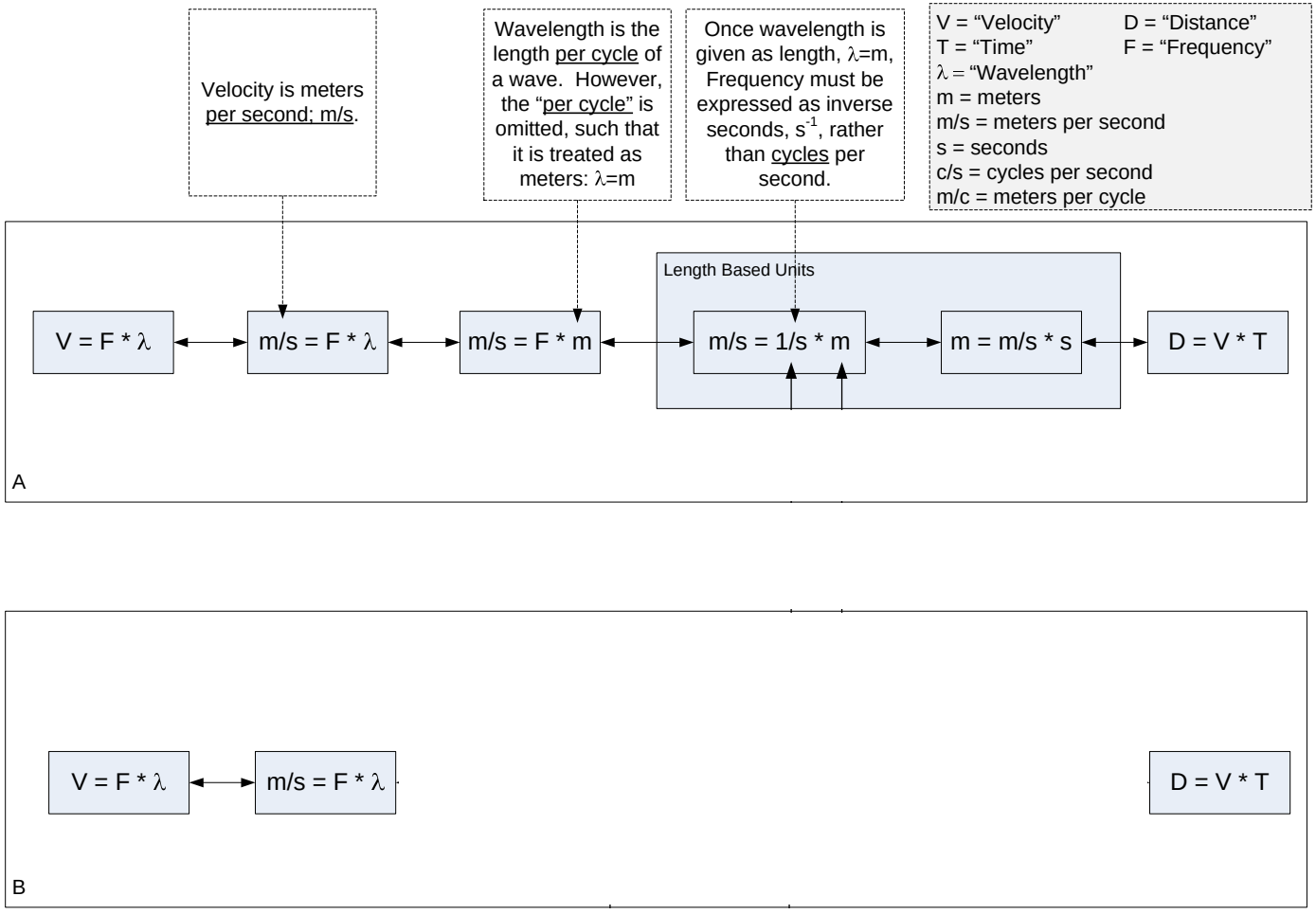
The Twin Paradox

In a model that distinguishes between Wavelength and Length, the two equations are not confused for one another.



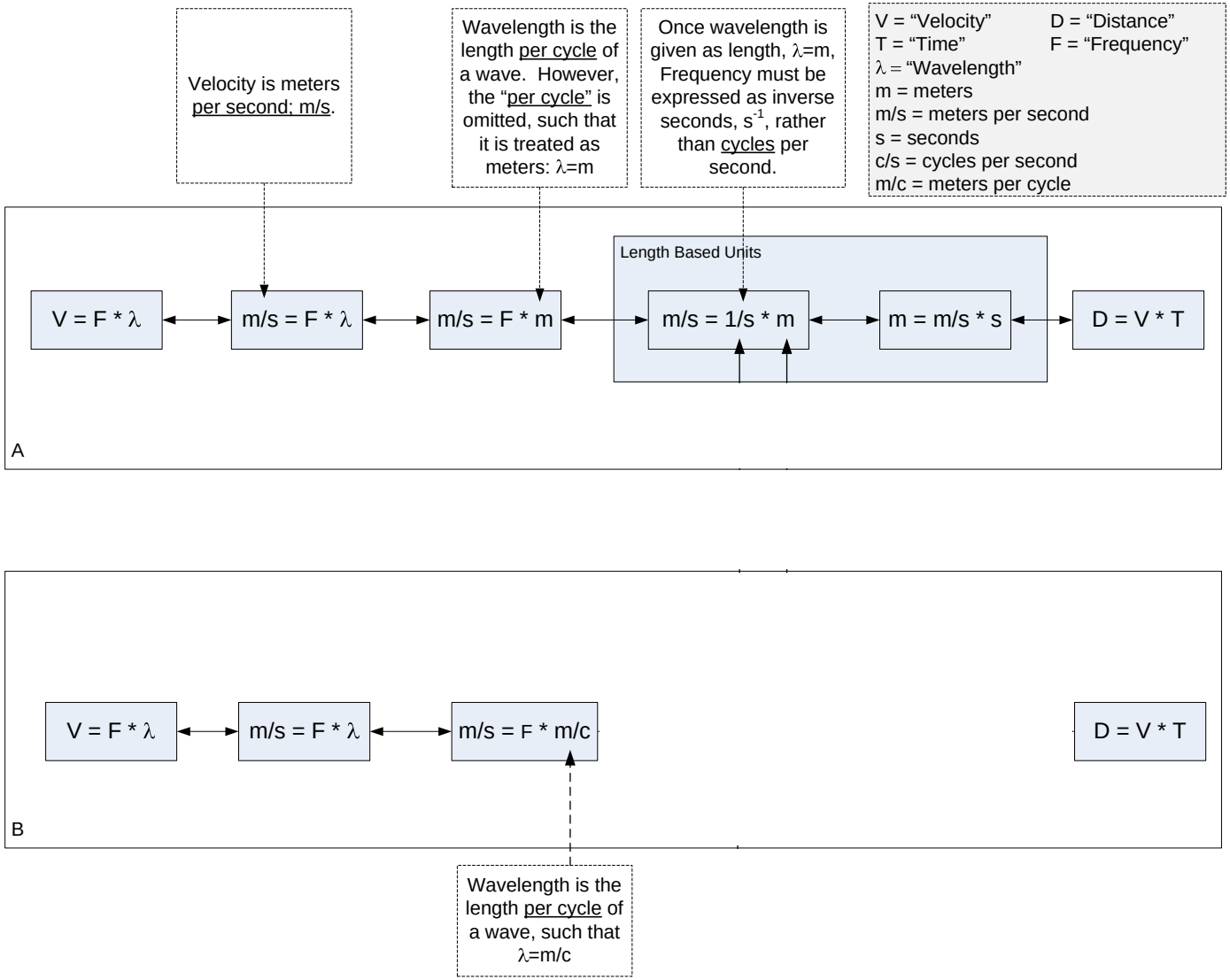
The Twin Paradox

We begin by replacing Velocity with meters per second.



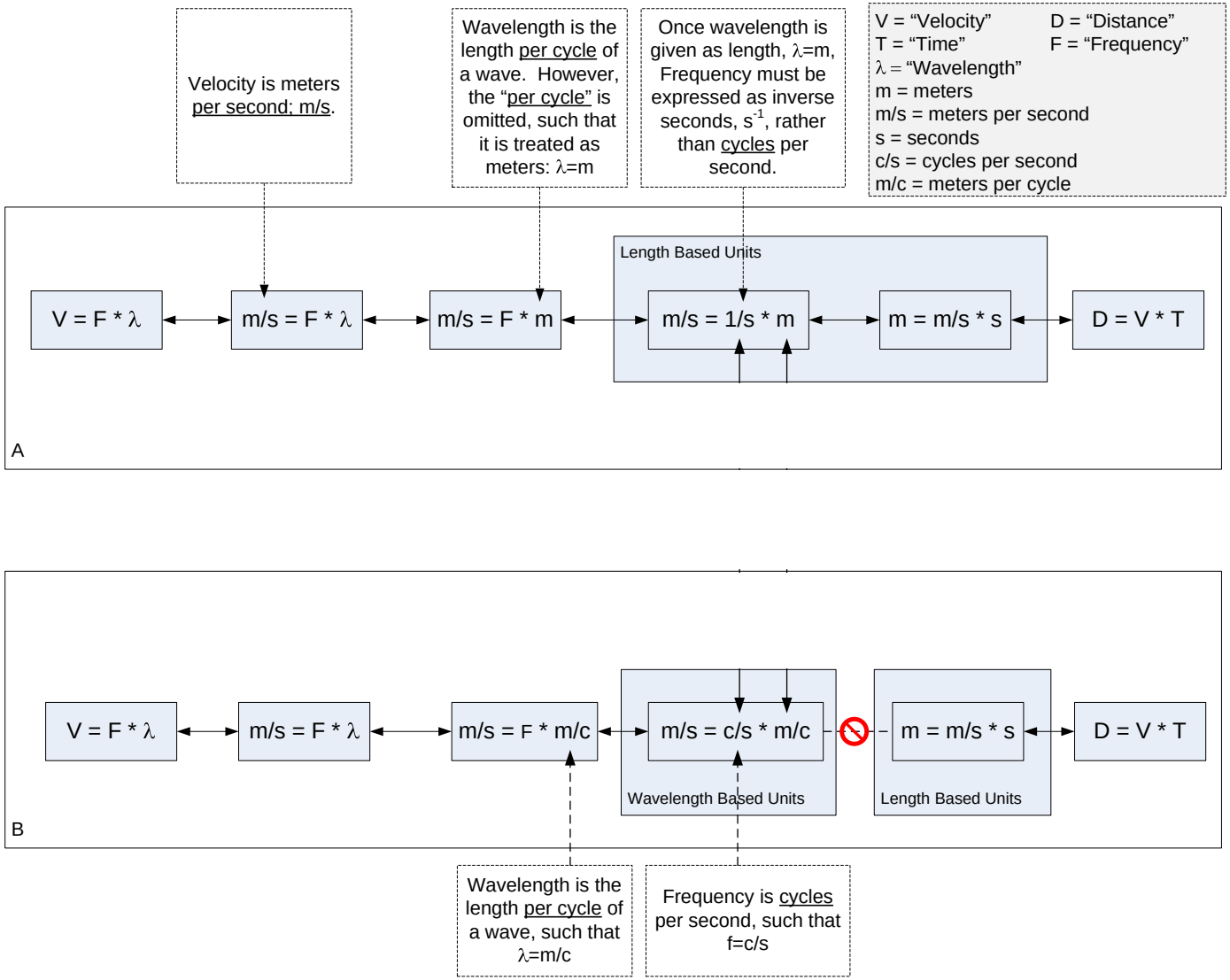
The Twin Paradox

Wavelength is replaced with “meters per cycle”, which is a rate.



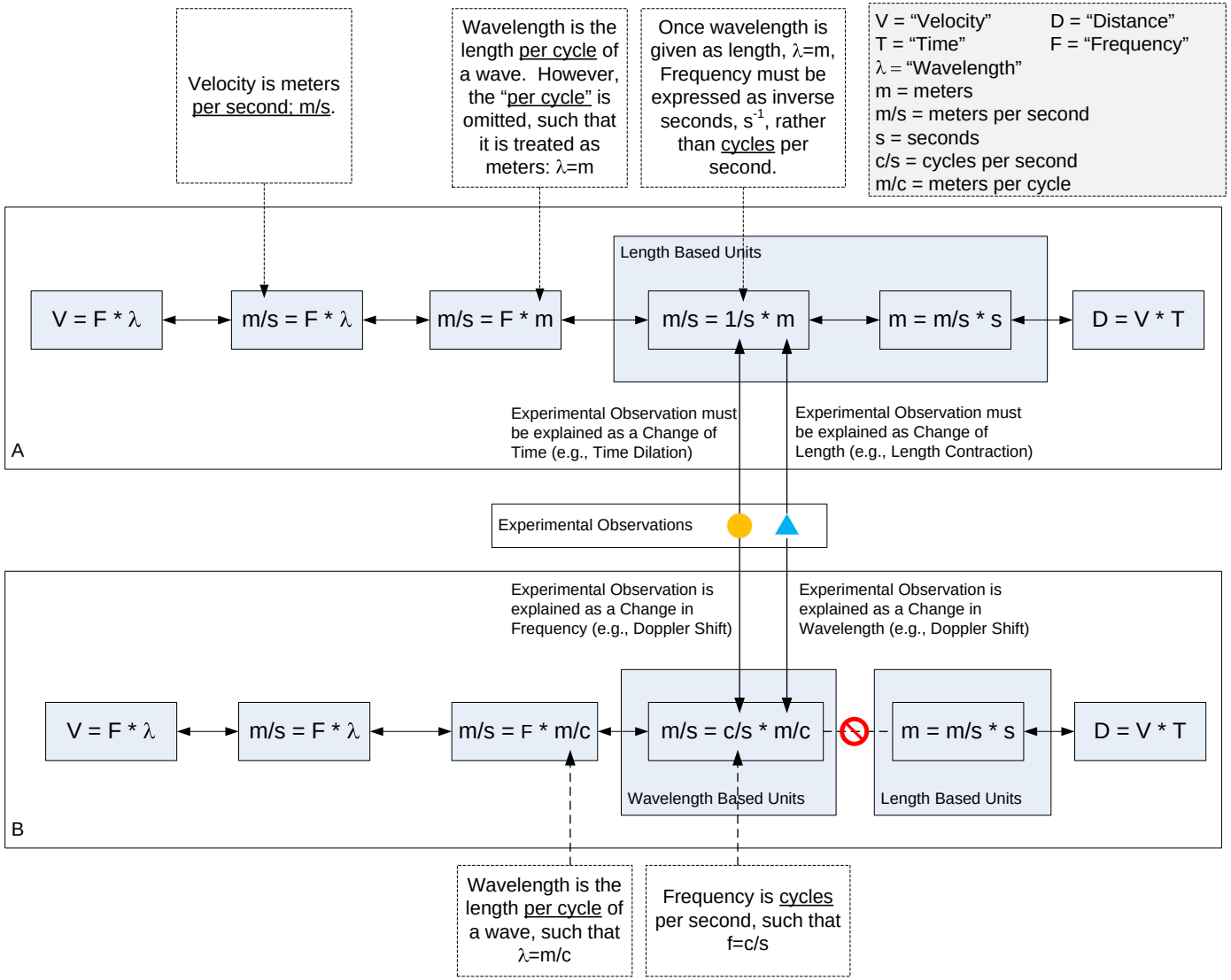
The Twin Paradox

Frequency must be cycles per second, which is what it was known as prior to calling it Hertz. The two equations are not confused for one another.



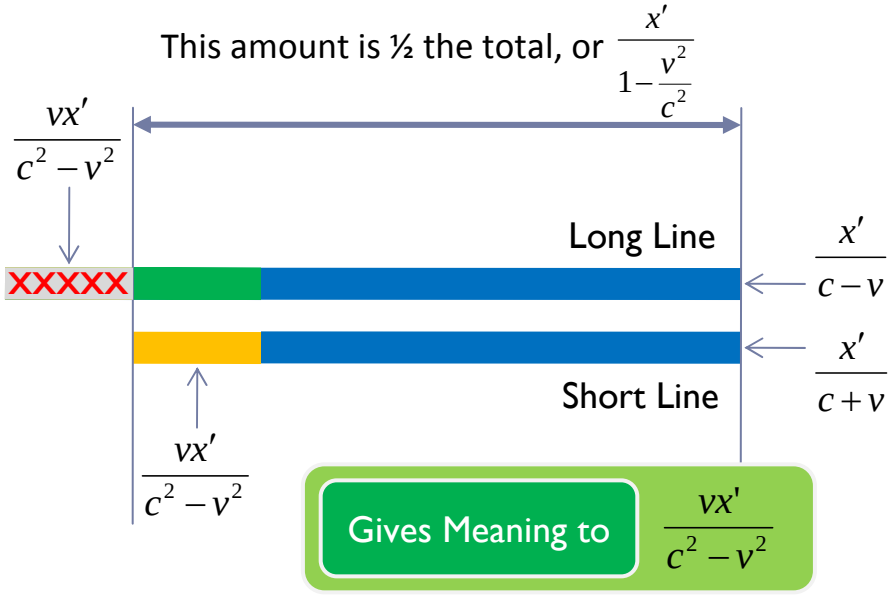
The Twin Paradox

Experimental observations are explained using Length terms in a Length based model, and Wavelength terms in a Wavelength based model.



What Does Einstein's τ Function do?

It answers the question "*What is the average of the Approaching and Receding Doppler shifts*"?



1. Subtract the short line from the long line to find "**remainder**"
2. Divide remainder into two equal parts
3. Either subtract ½ **remainder** from long line **or** add to short line

- **Three ways** to find ½ (or the average) of the total:
  - Add $\frac{x'}{c+v}$ to $\frac{x'}{c-v}$ and divide by 2
  - Subtract $\frac{vx'}{c^2-v^2}$ from $\frac{x'}{c-v}$
  - Add $\frac{vx'}{c^2-v^2}$ to $\frac{x'}{c+v}$

Key Finding

Einstein τ function finds the average of an Approaching and Receding Doppler shifts

$$\xi = c\tau_1 = c\tau(x',0,0,\frac{x'}{c-v}) = c\left[\frac{x'}{c-v} - \frac{vx'}{c^2-v^2}\right] = \frac{x'c^2}{c^2-v^2}$$

Average Doppler Shifts in Einstein's Paper

We can give a specific meaning to the equation in Einstein's time function.

Aus diesen Gleichungen folgt, da τ eine *lineare* Funktion ist:

$$\tau = a\left(t - \frac{v}{V^2 - v^2}x'\right),$$

Einstein's Equations (Source: Einstein's 1905 Paper)	Modern Classical Mechanics Interpretation	Relativity Interpretation
$\frac{v}{V^2 - v^2}x'$	Is ½ [Approaching Doppler Shift - Receding Doppler Shift] When added to the Receding Doppler shift, will produce the average. When subtracted from the Approaching Doppler shift, will produce the average. *(This is the alternative Einstein used to produce his equation.)*	This is the "adjustment to time."

Average Doppler Shifts in Einstein's Paper

In Einstein's 1905 paper, he produces the average Doppler shift equations for waves traveling along the X-axis, Y-axis, and Z-axis, which he then combines to call a "point."

Einstein's Equations (Source: Einstein's 1905 Paper)	Modern Classical Mechanics Interpretation	Relativity Interpretation
$\xi = a\frac{V^2}{V^2 - v^2}x'$	This is the equation for the average Doppler shift along the X-axis.	This is the X coordinate of a point.
$\eta = a\frac{V}{\sqrt{V^2 - v^2}}y$	This is the equation for the average Doppler shift along the Y-axis.	This is the Y coordinate of a point.
$\zeta = a\frac{V}{\sqrt{V^2 - v^2}}z$	This is the equation for the average Doppler shift along the Z-axis.	This is the Z coordinate of a point.

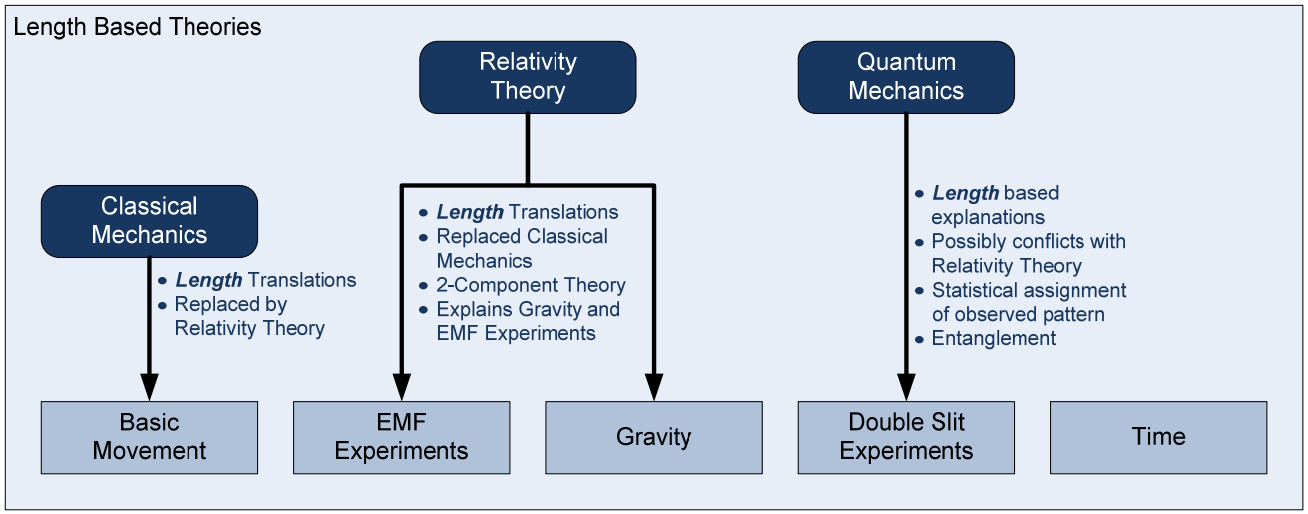
The Twin Paradox

The twin paradox occurs when a wavelength-oriented measuring system that should be measured in terms of wavelength and frequency instead **is interpreted in terms of length and time**.

- The equations apply to all types of waves. We can simplify our understanding by considering sound waves.
- The Doppler Shift with the longer wavelength dominates in the average. We can simplify our understanding by considering only this case.
- The Twin Paradox occurs because wavelength gets longer and frequency gets smaller. This Doppler shift occurs regardless of whether the "timekeeper" is on the train and the receiver is at the station, or visa versa. Relativity does not interpret it as a Doppler shift, but as a change in Time. This produces the Twin Paradox.

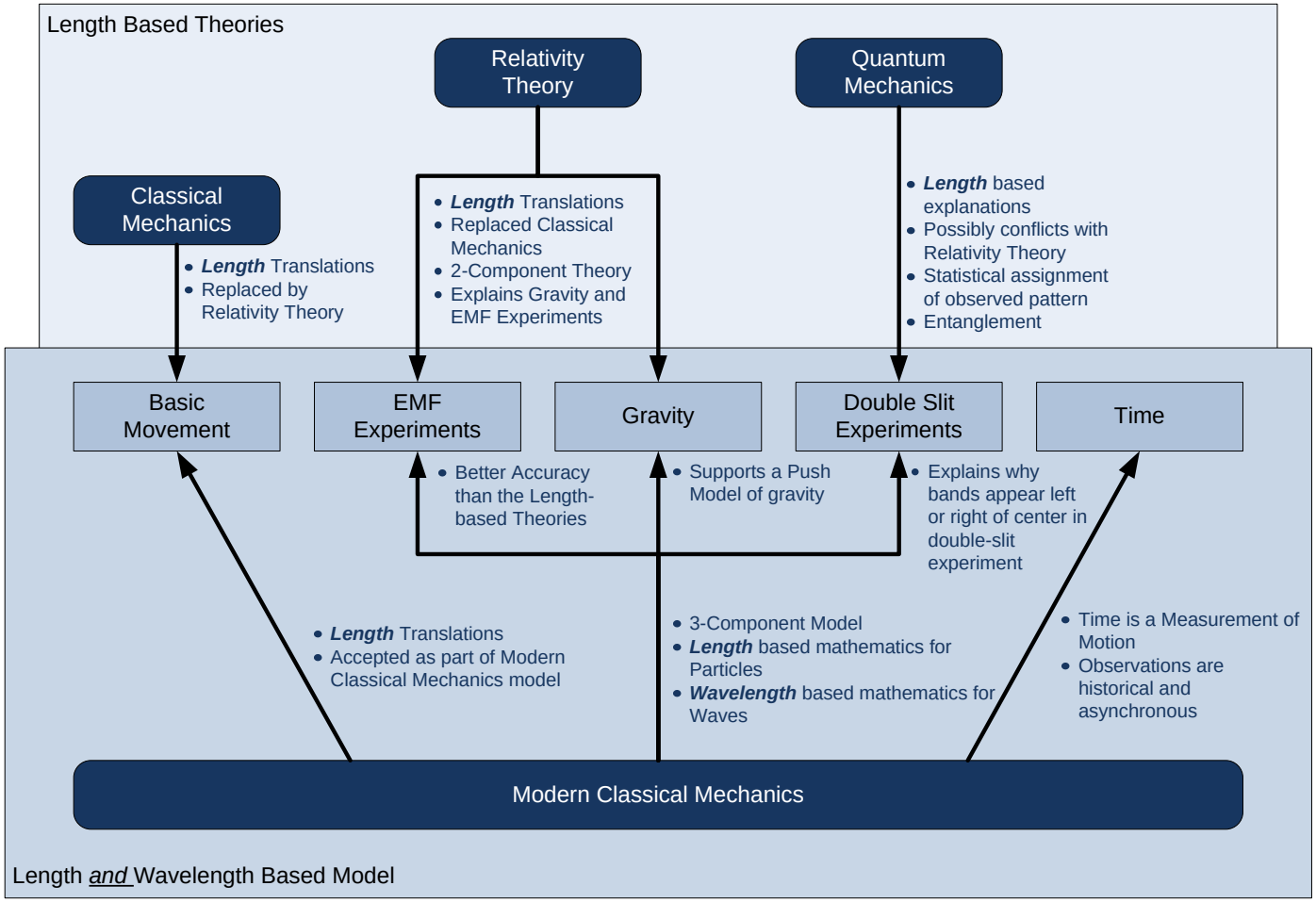
A Comprehensive Model

To date, no length-based only model has been found that unifies experimental observations across multiple areas.



A Comprehensive Model

Modern Classical Mechanics offers foundational explanations and mathematical equations **applicable across multiple areas of interest.**



Establishing Expertise

Expertise is the ability to explain things, in a meaningful way, that other people are unable to explain, or are unable to explain as thoroughly.

1	**Modern Classical Mechanics is a generalized 3-component system** (Outer System, Inner System, Moving Phenomena), with equations that describe the motion of the Inner System and the Moving Phenomena. Equations explain changes in Length and changes in Wavelength.	Relativity is a 2-component system (Reference Frame, Moving Frame), with equations that describe the motion of the Moving Frame. Provides equations that explain changes in length.
2	**Explains why theories like Relativity Theory absolutely require** concepts and explanations like **Length Contraction, Time Dilation, and the Twin Paradox**. Also explains why a model like Modern Classical Mechanics does not require any of these concepts.	Explains Length Contraction and Time Dilation only as being as an artifact of the theory. Does not explain why the theory absolutely requires them.
3	**Produces equations that are 100 times more accurate** than the Lorentz-Einstein equations for the MMX and Ives-Stillwell experiments.	Produces equations that are more accurate than the equations used by Michelson and Morley.
4	**Explains the mathematics of Einstein's derivation in terms of Average Doppler Shifts**. For example , it explains the (vx')/(c^2-v^2) equation in Einstein's 1905 derivation. Explains each of Einstein's X, Y, and Z transformations as being the average Doppler shift of the approaching and receding Doppler shifts for each axis.	Only explains equations as "adjustment to time" or the first, second, or their value in an ordered set.
5	Reveals that the **key conceptual geometric shapes of a Sphere and a Hypercone are not produced** in the Relativity derivation.	Presumes the formation of a Sphere and a Hypercone.

Summary

The key distinction to remember is that **Modern Classical Mechanics distinguishes between Length and Wavelength**.

1. You have a model that makes sense – it behaves the way you think it should.
2. This model produces results that are more accurate than the results produced by other models, like Relativity.
3. We are able to explain things about the other models (like Relativity) that those other models can't themselves explain.

Thank You

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www.RelativityChallenge.com
(website, presentations, papers and podcasts)

For More Information

Additional information can be obtained by visiting www.RelativityChallenge.com.

If You Want To Know About	Video To Look At
While Einstein's special wave proof fails because the transformed shape doesn't have a constant radius	Episode 21 & Bonus Episode 22 (NPA Conference Presentation
How Wavelength has been mistreated as a Length and its implications	Episode 20 (AAAS Conference Presentation)
Understand SRT, including Time Dilation, and Length Contraction, and why they are not needed in an Alternative Model	Episode 19
A look at Einstein's 1905 derivation as he performed it and using modern, accepted, function notation	Episode 17
A look at the similarities and differences between the Moving Systems Models [Michelson-Morley(1887), Lorentz(1904), Einstein(1905), Bryant(2003)]	Episodes 16 & 18 (NPA/AAAS Conference Presentations)
Revisiting the Michelson-Morley Experiment to reveal an Earth Orbital Velocity of 30 km/s	Episode 11 (NPA/AAAS Conference Presentation)