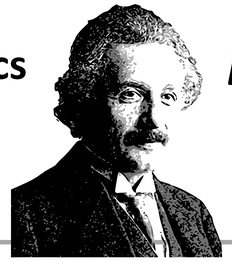
The classical mechanics–based theory of Modern Mechanics mathematically matches or exceeds the quantitative performance of special relativity



Einstein vs. *Newton*
The Rematch

$E = mc^2$ $\quad x' = x + vt$

GOALS:

1. Introduce Modern Mechanics, a Classical Mechanics based theory that matches and exceeds the performance of Relativity
2. Reveal extremely subtle but critical mistake that invalidate relativity
3. Explain how relativity can be wrong, yet provide useful mathematical answers

REMEMBERING WHAT YOU KNOW

Math definitions and rules you probably already know and that always apply

❶

A Circle (2D) or Sphere (3D) is defined as the set of all points that are the same distance from a common center.

Mathematically, these shapes can be expressed as:

$$x^2 + y^2 = r^2 \ (circle)$$

$$x^2 + y^2 + z^2 = r^2 \ (sphere)$$

❷

While performing a mathematical proof, you cannot use conclusions or implications that presume the proof was already true.

❸

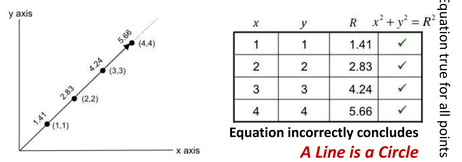
In math and science, a proper treatment of units must be maintain or you can get incorrect results.

WHAT TO WATCH OUT FOR

Beware of subtle hard-to-detect mistakes

⚠

When given values for variables on both sides of the equals sign, the *equality of the equation can be true, but* the shape may not be a circle (2D) or sphere (3D), because *their points do not share a common radius*.



x	y	R	$x^2+y^2=R^2$
1	1	1.41	✓
2	2	2.83	✓
3	3	4.24	✓
4	4	5.66	✓

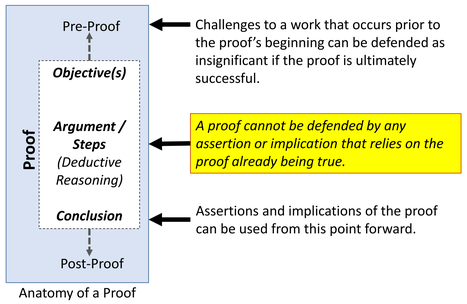
Equation true for all points

Equation incorrectly concludes *A Line is a Circle*

Any shape can be incorrectly classified as a circle when $x, y, and\ R$ values are given for each point, and the equations for a circle (2D) or sphere (3D) alone are used without confirming that the radius is constant for all points in the shape.

⚠

Statements and assertions that are True only after a proof is complete cannot be used as while developing the proof.



Anatomy of a Proof

Challenges to a work that occurs prior to the proof's beginning can be defended as insignificant if the proof is ultimately successful.

A proof cannot be defended by any assertion or implication that relies on the proof already being true.

Assertions and implications of the proof can be used from this point forward.

⚠

Mistakes in "Units" are all too common and may go unnoticed without a catastrophic (or near catastrophic) failure.

Failures Due to Incorrect Units

1. **Mars Climate Explorer**: Spacecraft crashes due to incorrect treatment of pounds (English) and Newtons (metric)
2. **Gimli Glider**: Air Canada aircraft runs out of fuel due to incorrect use of pounds (English) instead of kilograms (metric).
3. **Medication Overdose**: A patient was given 0.5 grams of a potent sedative instead of 0.5 grains. (1 grain = 0.065 grams!)

QUIZ: Which of the following will produce the correct answer, using the following equation?
$Distance(d) = Time(t) * Velocity(v)$

A: Velocity = 10 miles / 2 hours
B: Velocity = 10 grams / 2 hours
C: Velocity = 10 cycles / 2 hours
D: Velocity = 10 gallons / 2 hours
E: Velocity = 10 seconds / 2 hours
F: Velocity = 10 Hertz / 2 hours

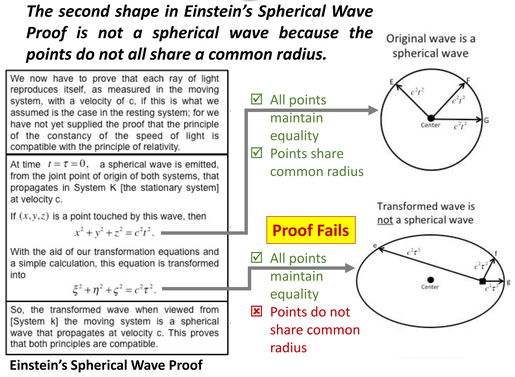
***Quiz Answer**: While division can be performed in every instance to produce five (5), **only 'A' produces a valid answer: 5mph**.*

PUTTING IT ALL TOGETHER

Use what you know is true to overcome deeply held convictions

⛔

The second shape in Einstein's Spherical Wave Proof is not a spherical wave because the points do not all share a common radius.



☑ All points maintain equality
☑ Points share common radius

Proof Fails

☑ All points maintain equality
☒ Points do not share common radius

Einstein's Spherical Wave Proof

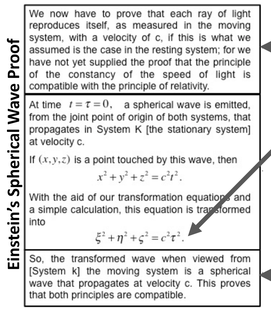
Q: Isn't Einstein's proof right if we consider the perspective of the moving observer, space-time curvature, length contraction, or some other relativistic term or implication?

A: Because the challenge is to the proof that establishes relativity, a conclusion or implication of that proof cannot be used during its derivation; otherwise we would simply say, "Relativity is right because it's relativity."

Go To: ❷

⛔

Relativistic concepts like length contraction, space-time curvature, or the "perspective of the moving observer" cannot be used as a defense until <u>after</u> the proof is complete.



Einstein says that relativity does not yet exists and needs to be proved.

The second equation is not a spherical wave because the radius is not constant. The transformed points are not the same length from a common center.

***Proof fails** before it is done.* The second shape is not a spherical wave. Cannot be defended with relativistic concepts, which do not exist until after the proof is done.

Q: How can Einstein's proof be wrong if his theory has been experimentally validated and has never been shown wrong?

A: I must explain why relativity works as well as it does (step 4) and I must find a minimum of one widely-accepted experiment that is believed to support relativity, but upon further evaluation contradicts it. The Michelson-Morley experiment accomplishes this goal, once its hard-to-detect mistake is corrected (step 3).

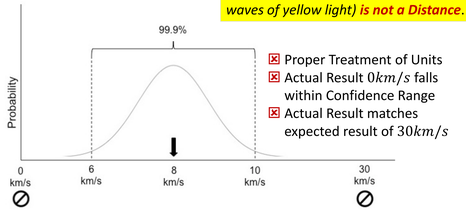
Go To: ❸

⛔

Due to an error in units, the Michelson-Morley experimental result does not support relativity because their answer of 8km/s (which is interpreted as experimental error) is incorrectly calculated.

The experiment's expected result equation requires a Distance, D. Michelson and Morley use: "$D = 2 * 10^7\ waves\ of\ yellow\ light$"

***Experiment fails. Cycles** (or number of waves of yellow light) **is not a Distance**.*



☒ Proper Treatment of Units
☒ Actual Result $0 km/s$ falls within Confidence Range
☒ Actual Result matches expected result of $30 km/s$

Q: How can relativity be wrong here and right everywhere else? Doesn't that suggest that your analysis is wrong and that relativity is actually right because it's still the only theory that predicts the results of other experiments and observations?

A: To answer that question, let's take a look at Modern Mechanics and see how it performs for the Michelson-Morley experiment to as well as how it performs with other experiments where relativity provides useful answers.

Go To: ❹

❹

What does the Doppler shift have in common with Relativity, Classical Mechanics, and Modern Mechanics?

There are two <u>equivalent</u> ways to find the average, ξ, of two expressions t and s:

❶ $\xi = \frac{1}{2}(t+s)$ *Additional mean equation*
❷ $\xi = t - \frac{1}{2}(t-s)$ *Subtraction mean equation*

Addition Mean Equation (Easy, familiar)

1. Let $t = cx'/(c-v)$ and $s = cx'/(c+v)$
2. Replace t and s in the addition mean equation
3. The average Doppler shift is $x'/(1-\frac{v^2}{c^2})$

Subtraction Mean Equation (Hard, unfamiliar)

1. Divide the Doppler equations by c.
2. Let $t = x'/(c-v)$ and $s = x'/(c+v)$
3. Find $½(t-s)$ in the subtraction mean equation as $vx'/(c^2-v^2)$ and rewrite the expression as $t - vx'/(c^2-v^2)$
4. Multiply the answer by c (to compensate for step 1)
5. Replace t and simplify
6. The average Doppler shift is $x'/(1-\frac{v^2}{c^2})$

Same average Doppler shift

Two Critically Important Questions:

❶ Does the average Doppler shift represent a spatial position? (Answer – No, it doesn't)
❷ What is the average of the two Doppler equations, $cx'/(c-v)$ and $cx'/(c+v)$?

$$\frac{1}{2}\left[\tau(0,0,0,0) + \tau\left(0,0,0, t + \frac{x'}{c-v} + \frac{x'}{c+v}\right)\right]$$

$$\tau = t - \frac{v}{c^2 - v^2}x'$$

$$\xi = c\left(t - \frac{v}{c^2 - v^2}x'\right)$$

$$\xi = \frac{c^2}{c^2 - v^2}x'$$

$$\xi = \frac{x'}{1 - \frac{v^2}{c^2}} \ (avg.\ Doppler\ Shift)$$

Source: Einstein's 1905 special relativity derivation

Einstein did not recognize that he used the subtraction mean equation to find the average Doppler shift and mistakes average Doppler shifts as spatial coordinates.

Modern Mechanics, classical mechanics, and relativity all use adaptations of the average Doppler equation in the change equation: $\Delta = \xi - x'$.

Classical Mechanics	Relativity	Modern Mechanics
• x' represents full wavelength	• x' represents full wavelength • Multiples ξ by $\beta = \sqrt{1 - v^2/c^2}$	• x' represents a half-wavelength, including with the ξ numerator
$\Delta = \xi - \lambda$	$\Delta = \beta\xi - \lambda$	$\Delta = \xi - \lambda/2$
☒ Does <u>not</u> perform well for experiments involving EMF	☑ Provides useful, identical or nearly identical results for experiments involving EMF	

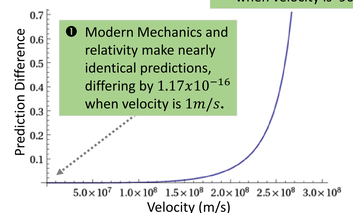
Performance: How does Modern Mechanics compare?

Experiments involving $E = mc^2$ (Equal Performance)

The Modern Mechanics and relativity change equations both have the same Taylor series first expression, which means they both produce: $E = mc^2$.

Michelson Morley Experiment (Better Performance)

Recognizes "cycles per second". The experiment was successful, returning 32km/s (expected 30km/s) once the experiment is evaluated with the proper units.



❶ Modern Mechanics and relativity make nearly identical predictions, differing by $1.17x10^{-16}$ when velocity is $1m/s$.

❷ Difference remains small at high velocities; rising to 0.84 when velocity is 90% of c.

Relativity can be invalid and remain useful because it's a close approximation for the Modern Mechanics change equation.

IMPLICATIONS

1. **Generalized Equations:** The full derivation of Modern Mechanics uses w to represent the velocity of the wave, which allows for its broad generalization to other wave mediums (e.g., sound).
2. **Faster than light travel:** Where a wave cannot propagate faster than w, this is not a constant on the velocity of a moving system. Just like a jet can break the sound barrier, Modern Mechanics allows for the possibility of faster than light vehicular travel.
3. **Faster than light communications:** Because w is simply the velocity of the wave, Modern Mechanics supports the possibility of propagation mediums with velocities far greater than c. This makes faster than light communications possible.
4. **Modern Mechanics is an intuitive, classical mechanics-based theory** that explains things that were previously the exclusive domain of relativity to relativity. *I'm not aware of any other theory that has done this before.*

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