# THE SINGLE BEST ARGUMENT AGAINST SPECIAL RELATIVITY

or

# *"THE EMPEROR'S NEW CLOTHES"*

by

*Ardeshir Mehta, N.D.*

ardeshirmehta@myself.com
http://homepage.mac.com/ardeshir/education.html

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## ABSTRACT

Imagine two objects, **A** and **B**, in rectilinear motion past one another. Imagine that **B** has a nice big "**X**" marked on it.

Now applying the equations of Special Relativity, how much time should it take for **A** to pass by the spot **X** marked on **B**, as measured by a stop watch carried on board **A**? Special Relativity requires that this time be calculated using the Lorentz transformation. **A**nd the Lorentz transformation requires that the stop watch should show a lesser time for this event if it is calculated under the assumption that **A** is moving and **B** is stationary, than it would if the time were calculated under the assumption that **B** is moving and **A** is stationary. Thus the Lorentz transformation requires the readings on the stop watch to be calculated to be *different,* depending on whether **A** is assumed to be moving or stationary. The Principle of Relativity, however, which affirms that there is no such thing as absolute rectilinear motion, requires that there be *no* way to tell which one of the two, **A** or **B**, is moving. Therefore the Principle of Relativity requires that the times are calculated to be the *same,* no matter whether it is assumed that **A** is moving and **B** is stationary, or that **B** is moving and **A** is stationary.

But of course it is impossible, both logically and mathematically, for a single mathematical problem to have both the same *and* different answers. (Heck, even my twelve-year-old younger son can grasp this!) So the Theory of Special Relativity must be logically as well as mathematically flawed, and we, along with my twelve-year-old, can all see that the Emperor Albert has no clothes on.

> "I will start very naively by a definition of what a scientist is. He is a person who will judge a matter purely by its scientific merits. His judgment will be unaffected by the evaluation that he makes or the judgment that others would make. He will be unaffected by the historical evaluation of the subject. His judgment will depend only on the evidence as it stands at the present time. The way in which this came about is irrelevant for the scientific judgment; it is what we now know today that should determine his judgment. His judgment is unaffected by the perception of how it will received by his peers and unaffected by how it will influence his standing, his financial position, his promotion — any of these personal matters. If the evidence appears to him to allow several different interpretations at that time, he will carry each on of those in his mind, and as new evidence comes along, he will submit each new item of evidence to each of the possible interpretations, until a definitive decision can be made. That is my naive definition of a scientist."

*Dr. Thomas Gold*
*Fellow, Royal Society (London)*
*Member, National Academy of Sciences (US)*
*Member, American Academy of Arts and Sciences*
*Member, American Philosophical Society*
*Fellow, American Geophysical Union*
*Honorary Fellow, Trinity College, Cambridge*
*Gold Medal, Royal Astronomical Society (UK)*
*Doctor of Science, Cambridge University*
*Honorary M.A. Harvard University*

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In May 1999, Prof. Umberto Bartocci of the University of Perugia, Italy, asked several of his colleagues to provide what each of them thought was "the single best argument against Relativity". Several people sent in their replies, a great many of which have been published on the Web at <http://www.dipmat.unipg.it/~bartocci/quest.htm>.

I myself was not asked the question (most probably because, me being a "nobody", Prof. Bartocci did not know me and had not even heard of me!) Moreover, at that time I personally did not think that Relativity was flawed. I, like most others on this planet, thought that Einstein was a genius, and the greatest scientist of the twentieth century; and thus I imagined that although he might have made a few mistakes here and there, he could not possibly have made so great a mistake that his entire Special Theory of Relativity had to be jettisoned.

But then, around the beginning of the year 2001, I read the arguments given at the above-mentioned Web page, and at many other Web pages on the Internet, challenging Relativity. I got in touch, via e-mail and even via snailmail, with several of the people who had published their views on the Internet challenging Relativity. From their arguments I quickly realised that it was not possible to affirm the logical and mathematical coherence of the Special Theory of Relativity. Indeed I saw that one did not even have to be an Einstein to realise that the Special Theory of Relativity was logically and mathematically inconsistent with its own assumptions!

So I too decided to have a go, and try to think up the single best argument against Special Relativity.

At present I think that the single best argument against Special Relativity is the one given by Prof. Herbert Dingle. He wrote in his 1972 book *Science at the Crossroads:*

> "It would naturally be supposed that the point at issue, even if less esoteric than it is generally supposed to be, must still be too subtle and profound for the ordinary reader to be expected to understand it. On the contrary, it is one of the most extreme simplicity. According to the theory, if you have two exactly similar clocks, A and B, and one is moving with respect to the other, they must work at different rates, *i.e.* one works more slowly than the other. But the theory also requires that you cannot distinguish which clock is the 'moving' one; it is equally true to say that A rests while B moves and that B rests while A moves. The question therefore arises: how does one determine, consistently with the theory, which clock works the more slowly? Unless the question is answerable, the theory unavoidably requires that A works more slowly than B and B more slowly than A — which it requires no super-intelligence to see is impossible. Now, clearly, a theory that requires an impossibility cannot be true, and scientific integrity requires, therefore, either that the question just posed shall be answered, or else that the theory shall be acknowledged to be false. But as I have said, more than 13 years of continuous effort has failed to produce either response. The question is left by the experimenters to the mathematical specialists, who either ignore it or shroud it in various obscurities."

Since the mathematicians have made it a point — as Prof. Dingle says — to "either ignore [this question] or surround it in various obscurities", we shall remove these obscurities here below: *i.e.,* we shall establish it *mathematically,* and thereby render Prof. Dingle's argument "bullet-proof".

## A THOUGHT-EXPERIMENT (AFTER THE MANNER OF EINSTEIN)

Let us conduct a simple "thought-experiment", after the manner of the Emperor himself. Let us imagine that **A** is a very, *very* long spaceship, moving at relativistic speed past an observation buoy **B**. To make things simple, we shall assume that the relative speed between **A** and **B** is exactly **0.8660254038** of the speed of light (accurate to ten decimal places). The Lorentz *gamma* factor, *viz.,* the factor according to which a moving clock works more slowly than a stationary one, is given by the formula $\mathbf{1/[1 - (v^2/c^2)]^{0.5}}$. If speed is expressed in units in which the speed of light, **c**, is equal to **1.00**, since $\mathbf{c^2}$ is in that case also equal to **1.00**, the formula for the Lorentz *gamma* factor reduces to $\mathbf{1/[1 - v^2]^{0.5}}$.

When v is **0.8660254038** of the speed of light, $\mathbf{v^2}$ is **0.75**, and $\mathbf{[1 - v^2]}$ is thus **0.25**, the square root of which is **0.5**, and the reciprocal of which is exactly **2.00**. Thus for a speed of **0.8660254038c**, the Lorentz *gamma* factor comes to **2.00** exactly. This will simplify the calculations here below.

(Not that it matters, because even if the equations are complicated, the same result is obtained: the Lorentz transformation equations are shown to be inconsistent with the Principle of Relativity *regardless* of what the relative speed between **A** and **B** is, or what the length of **A** is.)

Note, in addition, that the Lorentz transformation equations also dictate that the length of a moving object decreases along the axis of motion — its length when in motion being given by the length of the same object at rest divided by the Lorentz *gamma* factor.

So let us imagine — to make things yet simpler — that spaceship **A** is very, *very* long and cylindrical, somewhat like a huge unsharpened pencil without an eraser; and that its length, along the axis of which it moves relative to the buoy **B**, is exactly **259,627,884 metres** (*i.e.,* **299,792,458** multiplied by **0.8660254038**). Since the speed of light, **c**, is **299,792,458 metres per second**, according to Newtonian physics, if an object **259,627,884 metres** long moves past a stationary buoy at a speed **of 0.8660254038c**, an observer on the buoy will record a time of exactly one second for that object to pass by the buoy.

Let us imagine, then, that the spaceship **A** passes by the buoy **B** at a distance of only a few inches without the two crashing into one another or disturbing one another in any way — which in empty space is certainly not impossible. Let us say that as the spaceship **A** and the buoy **B** pass by one another, a blue laser light shines from a spot **X** on the buoy **B** towards the spaceship **A**, the direction of this light being at right angles to the relative motion between **A** and **B**. Thereupon the blue laser light impinges upon the hull of **A**. Light sensors located all over the hull of **A** sense this blue laser light whenever it shines on **A**, and as soon as it begins shining on **A**, these sensors activate a stop watch carried on board **A**, the stop watch being located exactly at the mid-point of **A**.

And let us imagine as soon as the sensors detect that the laser light has *stopped* shining on **A**, they send a signal to the stop watch to *stop* ticking.

Let us further suppose that all the sensors send *their* signals to the stop watch carried on board **A** at the speed of light. (This could be accomplished by a fairly uncomplicated system of optics, the exact details of which are obviously irrelevant here.)

Thus when **A** moves past **B**, the stop watch located at the mid point of **A** records the time taken for this event.

(Of course the stop watch carried at the mid point of **A** *starts* ticking with a delay of **0.4330127019 seconds** after the front end of **A** passes by **B**, because the sensors at the front end of **A** take that much time to send their signals at the speed of light to the mid-point of **A**, to get the stop watch *starting* to tick. But then again, this is exactly compensated for by the fact that the sensors at the *rear* end of **A** take exactly **0.4330127019 seconds** to inform the stop watch that the laser light from **B** has stopped shining on **A**’s hull, and thereby get the stop watch to *stop* ticking; and thus the amount of time recorded by the stop watch on **A** will be exactly the time it takes for **A** to pass by **B**.)

And furthermore, let us suppose that as the front end of **A** passes by **B**, an amber laser light emanating from the front end of **A**, pointed at right angles to the direction of relative motion between **A** and **B**, shines on a light sensor on **B** located right next to the spot **X**, activating a stop watch on board **B** located right next to the sensor. And let us also assume that as the rear end of **A** passes by **B**, a green laser light, similarly pointed at right angles to the direction of the relative motion between **A** and **B**, shines on light sensors carried aboard **B** right next to the spot **X**, and as soon as these sensors on **B** detect this green laser light, they send a signal causing the stop watch on **B** to stop ticking.

And finally, let us imagine that after both the stop watches stop ticking, an electronic camera located in front of the stop watch on board **A** snaps a photograph of the readout of that stop watch, and another electronic camera located in front of the stop watch on board **B** snaps a photograph of the readout of *that* stop watch. And we shall suppose that once this is done, these two snapshots are beamed electronically to earth from **A** and **B**, in much the same way the *Pioneer* spacecraft beamed us detailed pictures of Jupiter and Saturn and their moons. We shall imagine that *NASA* captures the snapshots with its instruments, just as it did with *Pioneer,* and distributes them to *CNN* and *PBS* and the *Discovery Channel* and all the other networks and newspapers for publication world-wide.

(Note that it doesn't matter at what speed either **A** or **B** are travelling relative to the *earth:* the electronically-beamed snapshots of the readouts of the stop watches arriving at Houston will be the same regardless of what *this* relative speed is.)

And now the 64-gazillion-dollar question: *exactly what should the snapshots show?*

Well, we have not actually *done* the experiment, and we aren't even likely to have enough money to conduct it in the reasonable future; so our only option is to figure out the answer using logic and mathematics. In order to do that, let us assume that Special Relativity *is* in fact correct — that is to say, that both the Principle of Relativity (which declares that there is no such thing as absolute motion) as well as the Lorentz transformations (which declare that a moving clock ticks slower than a stationary one) *are* in fact correct.

Let us first apply the Lorentz transformations in our calculations. If by applying the Lorentz transformations we obtain results contradictory to those predicted when applying the Principle of Relativity, we shall have to conclude that the Lorentz transformations themselves are not logically consistent with the Principle of Relativity, and/or *vice versa* — and as a result, neither is Special Relativity logically consistent, since it requires *both* the Lorentz transformations *and* the Principle of Relativity to be correct.

So let's see where the logic and the math lead us. Let us consider the following two scenarios:

*(1) Assume that **A** is stationary while **B** is moving, and*

*(2) Assume that **B** is stationary while **A** is moving.*

According to the Principle of Relativity, which assumes that all rectilinear motion is relative, it shouldn't matter which of the two assumptions is used to calculate the readouts: the readouts should be the same regardless, because if they were not, it *would* be possible to tell which of the two, **A** or **B**, is moving — namely, the one giving the shorter time!

So let's do the math, accurate to ten decimal places, and lay Special Relativity to rest once and for all.

## (1) ASSUME THAT A IS STATIONARY WHILE B IS MOVING

If **A** is considered to be stationary, the Lorentz transformations declare that its time is *not* dilated, nor its length foreshortened. So under the assumption that **A** is stationary and **B** is in motion, **B** must be moving past an object, namely **A**, which is **259,627,884 metres** long, at a speed of **0.8660254038** of the speed of light — that is to say, at **259,627,884 metres per second**. The time registered on a stationary clock for such an event will be, therefore, *exactly **one second**.*

That, therefore, must be what the snapshot of **A**'s stop watch would show, if we assume that **A** is stationary and that **B** is in motion past **A**.

But since **B** is moving, its time will be dilated by a factor of **2.00** — assuming of course that the Lorentz transformation formulae are correct. Thus the snapshot of **B***'s* stop watch should show exactly ***half* a second**.

Naturally this is in line with what all proponents of Relativity declare: namely, that a moving clock shows less time for the same event than does a stationary clock. So far so good (at least for the storm troopers of the Emperor.)

But now consider what happens if we assume that it is **A** that is in motion, while **B** is stationary. **A**ccording to the Principle of Relativity, this should be equivalent in every way to saying that **B** is in motion while **A** is stationary, because there can be no such thing as absolute rest. So the results have got to be the same as those calculated in (1) above, because if they are not, we would *know* which of the two, **A** or **B**, is in motion.

But *are* the results the same? Let's do the math.

## (2) ASSUME THAT B IS STATIONARY WHILE A IS MOVING

Consider what happens if it is assumed that **A** is moving while **B** is stationary. The time on board **A** *is* now dilated by a factor of **2.00**: and as a consequence, the stop watch on board **A** ticks twice as slowly as the stop watch on board **B** ticks.

Moreover, according to the Lorentz transformation, the length of **A** is *half* of what it was when **A** was at rest. Its length will, in fact, now be (**259,627,884 metres** divided by **two**), which is to say, **129,813,942 metres**.

But the *relative* speed between **A** and **B** will not have changed. **A**s a consequence, the time recorded by the stop watch carried on board **A** will be just ***one quarter of a second***!

Note that the stop watch carried on board **B** would record only ***half*** **a second** for an object **129,813,942 metres** long to whiz by it at **0.8660254038** of the speed of light — that is to say, at **259,627,884 metres per second**. (And this is the same result we got when we assumed that **A** was stationary and **B** was in motion, so the answer must be right since it's been double-checked.)

But since the stop watch on **A** ticks *half* as fast as does the stop watch on **B** — *i.e.,* for every tick of the stop watch on **A**, the one on **B** ticks twice — the stop watch on **A** records only *half* of half, which is to say, ***one quarter,*** **of a second**.

Even if it be argued that to a hypothetical observer on board **A**, its length would *not* appear shrunken, the *time* dilation of the stop watch carried on board **A** should still show ***half*** **a second**, and not a ***full*** **second** as was calculated when it was assumed that **A** was stationary.

And even if it be further argued that to a hypothetical observer on board **A**, its *time* would not appear dilated either, and thus the stop watch on board **A** would show **one *full* second**, how is it possible that the stop watch on board the *moving* object — *viz.,* the spaceship **A** — shows *more* time elapsed for the same event, compared to the time shown by the stop watch on board the *stationary* object, *viz.,* the buoy **B**, whose stop watch shows only *half* a second under these very same assumptions? Now that *would* put the Lorentz transformation upside down and on its head, wouldn't it.

In any case, the question still remains: after the snapshots of the stop watches are beamed back to Houston and distributed to *CNN, Time Warner* and all the other media, what will the population of earth see on their TV screens — a snapshot of a watch face carried on board **A** that reads *one* second, or a snapshot of a watch face on **A** that reads ***one quarter*** **of a second**, or a snapshot of a watch face carried on board **A** that reads ***half*** **a second**?

... Or something in-between? (If both **A** and **B** are assumed to be moving, the readout of the stop watch carried on board **A** would be somewhere *between* **1** and **0.25 seconds** — work it out for yourself!)

Note that there can be *no question* about the figure of ***one*** **second** shown by the stop watch carried on board **A** calculated for this event, when it is assumed that **A** is stationary while **B** is moving. Whether Special Relativity is true or not, that figure *must* be correct.

So the only question is, is there a *different* time for the same event if it is assumed that **B** is stationary while **A** is moving — or are the times the *same?*

It is impossible for there to be a *different* time if we assume that the *Principle of Relativity* is correct, for given a different time, we *would* know which of the two, **A** or **B**, is in motion and which is at rest: the one at rest would record the longest possible time for the same event. **A**nd knowing which one is at rest would contradict the Principle of Relativity, which asserts that there is no way to know that.

But neither is it possible to have the *same* time for this event under both assumptions — *i.e.,* the assumption that **A** is at rest and **B** is in motion, and the assumption that **B** is at rest and **A** is in motion — because then the *Lorentz transformation equations* would be contradicted!

No matter how you fudge the figures, it is *impossible* to obtain *any* readings for the stop watch on board **A** which fit the Lorentz transformation *and* which are *also* consistent with the Principle of Relativity.

> **Indeed, I hereby challenge *anyone* to give a consistent answer to the above question — one that does not contradict either the Principle of Relativity or the Lorentz transformation equations. Go ahead ... *make my day!***

Obviously something must be logically *and* mathematically wrong with either the Lorentz transformation or the Principle of Relativity — or both — because it is logically and mathematically *impossible* for the stop watch carried on board **A** to give a reading that is *both* the same *and* different when calculated under assumption (1), *viz.,* the assumption that **A** is moving while **B** is stationary, compared to the reading calculated under assumption (2), *viz.,* the assumption that **B** is moving while **A** is stationary.

To be logically and mathematically consistent, one would have to jettison either the Lorentz transformation or the Principle of Relativity, or both. **A**nd since both of these are at the very heart of Special Relativity, without them, Einstein's Special Theory of Relativity completely and utterly collapses.

## COMMENTS

Any comments or questions? You are welcome to e-mail me, especially if you are a scientist!

But let me ask *you:* **A**re you — as Dr Gold puts it — "a person who will judge a matter purely by its scientific merits ... having a judgment unaffected by the evaluation that you make or the judgment that others would make? Will you be unaffected by the historical evaluation of the subject? Will your judgment depend only on the evidence as it stands at the present time? Will the way in which this came about be irrelevant for the scientific judgment? Will your judgment be unaffected by the perception of how it will received by your peers and unaffected by how it will influence your standing, your financial position, your promotion — any of these personal matters?" For *that* is my (admittedly naive) definition of a scientist, as it is Dr. Gold's.

(*BTW:* Just answer me the following simple question: how does a person get to be a Professor at a prestigious institution — let alone win a Nobel Prize — when he or she can't even see this elementary argument, which, as I said in the **A**bstract, even my twelve-year-old can understand? Is it indeed a case of "the Emperor's fine new clothes", which no will admit to not seeing, for fear of appearing ridiculous in the eyes of their peers?)

## POSTSCRIPT

*Added on Monday, November 19, 2001*

It has been claimed by more than one e-correspondent of mine that if — in the most general terms — the "proper length" of the spaceship were **L**, and the velocity of the spaceship relative to the buoy were **v**, then the time recorded by the stop watch on board the spaceship must be **L/v**, while the time recorded by the stop watch on board the buoy must be **L'/v**, where **L'** is the "apparent" or "co-ordinate" length of the spaceship, given by the equation $\mathbf{L' = L(1 - v^2/c^2)^{0.5}}$.

But this claim results in an impossible situation; because if (hypothetically) a "light clock" of the type described, for example, in the Web pages:

<http://www.brown.edu/Students/OHJC/ma8/papers/dilate.htm>

… and

<http://pads1.pa.msu.edu/courses/1997spring/PHY232/lectures/relativity/dilation.html>

… were placed on board the spaceship, with a distance between its mirrors of exactly **0.299792458 metres** — so that light takes exactly **one nanosecond** to travel from one mirror to the other — then if **v** were large enough, **L'** would be small enough from the vantage point of the buoy, so much so that the entire spaceship would pass the buoy before light could reach one of the mirrors from the other. That is to say, if **v** were close enough to the speed of light, then *according to the light clock carried on board the spaceship,* the time taken for the spaceship to pass the buoy would be **less than one nanosecond** — which would contradict the reading **L/v** purportedly indicated by the stop watch carried aboard the spaceship: a reading which, if **L** were large enough, could even be as great as **a billion nanoseconds**, or more.

It is to be noted above that the reading of **less than one nanosecond** is indicated by the light clock carried *on board the spaceship,* and not by a clock carried on board the *buoy!*

Then the question must surely arise: if the "light clock" were also arranged, like the stop watch, to start and stop in such a manner as to indicate the time taken for the spaceship to pass the buoy, and its stopped readout beamed back to earth along with those of the other two stop watches, would its readout agree with that of the stop watch on board the spaceship, or not?

For if it does, then obviously that which would have been observed from the vantage point of the buoy, namely the light clock on board the spaceship registering **less than one nanosecond** for the spaceship to pass the buoy, would obviously not be correct: after all, the light clock, when used as a stop watch, can only register *one* readout when it is stopped! In that case, one would have to assume that the readout of the light clock observed from the vantage point of the buoy would register less than one nanosecond *only in appearance,* not in reality — that such a readout would be an artefact, a mirage, a *trompe d'œil,* a mistake in observation; and that in reality there was no time dilation whatsoever aboard the spaceship.

On the other hand, if the readout of the light clock does *not* agree with that of the stop watch on board the spaceship, it would mean that two accurately constructed timepieces cannot agree with one another, and that too, by a *humongous* margin: not even *when both are stationary relative to one another,* and located in the *same* inertial frame of reference … which is an impossibility, even in Relativistic terms.

Either way, time dilation as proposed by Relativity could not exist *in reality:* at best, it could exist only *in appearance.* In which case, Relativity would lose all rights to be called a theory of *physics.* **A** theory of *illusions,* on the other hand, well, maybe … ☺ !

## POST-POSTSCRIPT

*Added on Thursday, January 24, 2002*

The fact that the Theory of Relativity can't possibly be correct is much more easily seen if we conduct the experiment as follows: *(I)* In Stage One, the spaceship and buoy pass one another at speed **v** as described earlier, and the readouts of the stop watches photographed; *(II)* in Stage Two, the stop watches are re-set to zero, and one of the two spacecraft — say, the spaceship — is *decelerated* so as to come to rest relative to the buoy; *(III)* in Stage Three, the *other* spacecraft — in this case, the buoy — is *accelerated* so as to reach the speed **v** relative to the other spacecraft — in this case, the spaceship — and the two are made to pass one another again, the readouts of the stop watches being photographed a second time.

Now if in Stages One and Three the readouts of the buoy's own stop watch are the *same* — let us say that in *both* Stages they indicate a time interval of **L'/v** for the two spacecraft to pass one another, as mentioned in the Postscript above — then there *cannot have been any time dilation* due to the movement of the buoy (and note that under the above circumstances, the buoy's *own* speed in Stage Three *cannot* be the same as its *own* speed in Stage One, and indeed in each of the Stages it was moving at a speed **v** relative to its *own* speed in the other Stage!)

On the other hand, if in Stage One the time interval recorded by the buoy's own stop watch is *shorter* than the time interval recorded by the *same* stopwatch in Stage Three, then we can tell that in Stage One the buoy was moving while in Stage Three it was not; and *vice versa,* if in Stage One the time interval recorded by the buoy's own stop watch is *longer* than the time interval recorded by the *same* stopwatch in Stage Three, then we can tell that in Stage Three the buoy was moving while in Stage One it was not. In other words, if this is what the stop watch readouts show, the Principle of Relativity cannot be correct.

But in either case, the Theory of Relativity is disproved.