Re: Nobel Prize for David Thomson?!

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From: Bjoern Feuerbacher (*feuerbac_at_thphys.uni−heidelberg.de*)
Date: 01/05/05

Date: Wed, 05 Jan 2005 11:58:20 +0100

David Thomson wrote:
> "Bjoern Feuerbacher" <feuerbac@thphys.uni−heidelberg.de> wrote in message
> news:cre0i8flm6@news.urz.uni−heidelberg.de...
>
>>>>>If you're going to make c = 1, you have to do it on both sides of the
>>>>>equation.
>>
>>Obviously. Your point? There is no "c" on the left hand side
>>of the equation E = m c^2.
>
>
> My point is that if E=mc^2 is an equality, then there IS an implied c^2 on
> the left hand side of the equation.

So when one sets c=1, there is an implied 1^2 on the
left hand side of the equation. Your point?

> But if there is an implied c^2 on the
> left hand side of the equation, then E cannot be the unit of joule.

Sorry, how on earth does that follow?

(BTW, your probably meant "then E cannot have the unit of Joule"?)

> It is
> merely an empty variable since a joule is a specific quantity of energy.

Sorry, I don't understand at all what you are trying to say
here.

What is an "empty variable"?

> And if E is an empty variable, then E=mc^2 is not an equation, but a mere
> formula.

What is the difference?

[snip]

>>>>>And if you say that E doesn't really equal mc^2, then you didn't
>>>>>have an equation to begin with.
>>
>>Actually, E = gamma m c^2, or E^2 = p^2 c^2 + m^2 c^4.
>
>
> Even still, E cannot be the unit of energy

Above I suspect you meant "E cannot have the unit of energy",
but here you repeat the phrase with "be".

What on earth do you mean with this sentence? No one ever
said that E *is* the unit of energy! 1 Joule is the unit of
energy; E is simply the symbol used for energy in equations!

> since the c is a constant with
> dimensions of velocity and a value other than one.

What has that to do with your statement above that E cannot
be the unit of energy?

> Also, even if c could
> be made to equal "one" on just the right side of the equation, you can't add
> unlike units.

We don't do. Why do you think we do?

In natural units (c = 1), mass and momentum are measured in
units of Joule (or electron Volt), so in the equation
  E^2 = p^2 + m^2,
only equal units are added.

> No matter how you present this, it violates the basic laws of
> math.

Again: math does not say anything about units, and math has no
laws.

> Not only is the above equation not an equation,

Which one of the several listed above?

> but is also not a formula since E^2 is not a variable.

Sorry, I have no clue at all what you mean here.

Please tell us what exactly you mean with "equation", "formula",
and "variable".

[snip]

>>>>>Do you see the nonsense of c=1 now?
>>
>>I see only that you do not understand what setting c to 1 means.
>
>
> It is obvious that you have no rational argument for setting c=1,

It's a choice of units. What is irrational about that? We
simply choose to measure mass and momentum in J (or eV). What's
your big problem with that?

> because you don't adhere to the law of equalities.

Please state that law and give a reference for it.

> You don't treat both sides of
> the equation as being equal to each other.

I do. Why on earth do you think otherwise?

> You artificially change one side
> of the equation without changing the other.

I don't. Why on earth do you think so?

> Relativity theory is based on
> the violation of simple mathematics.

Again: units have nothing to do with mathematics.

> Therefore, relativity theory is
> nothing more than a basic mistake.

Hint: different systems of units were already in use
way before relativity was invented.

>>>>You left off the momentum:
>>>>
>>>> E^2 − p^2 = m^2
>>>
>>>Hey, did you take algebra in grade school? You can't subtract momentum
>>>squared from energy squared because the dimensions don't agree.
>>
>>The dimensions do agree when one chooses the units accordingly.
>
>
> LOL. Dream on.

I notice that you did not bother to present an actual
counterargument.

If one chooses c=1, the dimensions of length and time are
the same, and velocities are dimensionless. Then in the
equation above, all terms have the same dimension (namely
energy squared, which is the same as momentum squared, and
the same as mass squared).

>>>Can't you explain anything without violating the simple laws of math?
>>
>>Err, "dimensions" (in the sense above) is a concept of physics,
>>not of math.
>
>
> Wrong.

No. What I said is perfectly right.

> It is a concept of algebra applied to physics.

Algebra says nothing about units. If you think otherwise,
please show me an algebra book discussing units.

> The dimensions could
> just as easily be variable such as:
>
*> X = y * (3 x 10^8 z)^2*
>
> In the above example applied to MKS units, X is given the unit of one joule,
> y is given the unit of one kilogram, and z is given the unit of one meter
> per second. In order for the above equation to remain vailid, whether it is
> in pure algebra or in physics, the rules apply to algebra must be adhered
> to.

Agreed.

> In your case of c=1, it is the same thing as replacing 3 x 10^8 z with
> one.

And additionally choosing the units so that z is dimensionless.
You seem to have missed that crucial additional step.

> If you do that using algebra, the correct way to do it is:
>
> X / (3 x 10^8z) = y

That has nothing at all to do with "replacing 3 x 10^8z
with one". What on earth are you talking about?

> or in your equation:
>
> E / c^2 = m

That has nothing at all to do with choosing c=1.

> *Now if it is correct that E is equal to mc^2, then we can simplify to:*
>
> *m = m*

You haven't understood a bit.

> *But if E is just a variable,*

"variable" in what sense? And why "just" a variable? What
could it be more?

> *then you have to keep the previous value of c*
> *on the left side of the equation*

How does that follow?

> *such that if c=1 only on the right side of*
> *the equation, then:*
>
> *E / (3 x 10^8v)^2 = m*
>
> *The above equation is the correct way to make c=1 on just the right side.*

No, this still has nothing at all to do with the choice of
units which makes c=1.

Bye,
Bjoern