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Maxwell-Tombe's Unified Force Equation

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A Unified Force equation can be formed merely by adding an extra force to the well-known Lorentz force equation. However, there have been issues such as misuse of the term "centrifugal force" that have obscured this.

Based on David Tombe's article [1] he starts from:

Force = differential of momentum with respect to time

in usual notation this is:

F = dp/dt

(where force and momentum as vectors)

But where his notation he writes as E= dA/dt . (For a while this fooled me, because I think of E as energy, but here he is using E to represent force.)

So, what we have here is the usual Force equation of Newton

He then expands this as equal to:

Lorentz force + what he calls centrifugal force

where Lorentz force is electric force + magnetic force

The use of the term "centrifugal force" presents a problem of meaning, which I will deal with anon.

At the present we can note:

Newton force (dp/dt) = electric force (F_e) + magnetic force (F_m) + centrifugal force

(How he gets this equation by re-arrangement of terms is in his paper. [1])

In electromagnetic theory, they deal with just electric force and magnetic force, so they drop centrifugal force, and so just talk about:

Lorentz force = electric force (F_e) + magnetic force (F_m)

This is the equation that Maxwell deals with.

So, to get total force, one need merely add centrifugal force to this to give:

Newton force (or total force) = Lorentz force + centrifugal force

And he identifies this Newton force (total force) as unified force.

So, that's the unified force equation.

It is rather easy as to how this equation is formed, namely just add centrifugal force to Lorentz force then you have unified force.

He also notes that this equation should have been formed by Maxwell.

i.e. its Maxwell-Tombe's Unified Force equation.

In Physics courses up to postgraduate level when dealing with Maxwell's electromagnetic theory in elementary or advanced level, they do not mention this unified force equation.

Instead they present electromagnetic field theory and miss out the other field (associated with this extra force) which would make it unified field theory.

Namely, they deal only with equation:

Lorentz force = electric force + magnetic force

They never add centrifugal force to the right side to make the equation:

Maxwell-Tombe unified force = electric force + magnetic force + centrifugal force

One flaw here is the use by David Tombe of the term "centrifugal force"; it has at least two meanings.

The usual meaning attached to "centrifugal force" by the Establishment is that it is a fictitious force and does not really exist, and this is the meaning that most people have been taught.

However, this is not strictly true as David Tombe argues in other papers.

i.e. the term "centrifugal force" can also represent a real force not mere fictitious force.

The fictitious force is one where they appears to an observer to be a force from his frame of reference to an object that he is observing, however the object is not really experiencing a force, but instead the observer is observing from a frame of reference that makes it appear that there is a force on the object. For instance if the observer is rotating, then there is a force on the observer due to this rotation, but observing an object outside his rotating reference frame he might assign that rotation to the object, hence assigning a force to that object. But since the force is really on he himself the observer, and not on the object being observed then assigning a force to the object is a "fictitious force." This is an example of a "fictitious centrifugal force".

However, as well as a "fictitious centrifugal force" there is also another type of centrifugal force called a "real centrifugal force."

In the education of physics students there is only mention of the "fictitious centrifugal force" and never any mention of the latter type of centrifugal force, hence all students are deceived into thinking that all centrifugal forces are "fictitious centrifugal forces" and are not made aware of the "real type".

It is the "real centrifugal force" that David Tombe is referring to in his equation for Maxwell-Tombe Unified force.

The meaning of the word "centrifugal" is away from the centre, and meaning of "centripetal" is towards the centre.

So, for a weight whirled around on a piece of string; there is a force inwards towards the centre on that string called centripetal force. Now, by Newton's law of force: to every force there is an equal and opposite reactive force. So, as well as this centripetal force inwards there is a force outwards called centrifugal force. This is the "real centrifugal force" and its existence stops the weight moving into the centre from which its being whirled.

Once the weight is released from being whirled, it of course moves off in a straight line tangent from the direction it is being whirled.

Sometimes naïve students when asked to guess what will happen after the weight is released from being whirled, will think that the weight will spiral off. They are then surprised to see the weight travels off not in circles, but in a straight line. And the Teacher will say that their mistaken belief is due to thinking centrifugal force is real, when it is fictitious. This however is a misuse of the word centrifugal force, because the centrifugal force was along the direction of the string when it was being twirled, it is not to do with the direction that the weight takes after it has been released from twirling. It would be more proper to say that the weight moved off in the way that it did by inertia.

There are other semantic problems – i.e. difficulty with meaning of words. For instance where David Tombe says "aether" I might say "field".

In correspondence with David Tombe, he says on this matter:

" I don't mind if you call it 'field' or 'aether'. The point is that we are assuming that space is compressible and dynamical. We don't know what the aether/space/field is. But we do know that it exists and that it causes the fundamental forces."

Unfortunately in this statement there are other issues of semantics besides just the word "aether" and "field", because for instance he talks about space being compressible, and what that means is dependent on what is meant by "aether", "field" et al.

In Conclusion: this unified force equation from Maxwell-Tombe is remarkably simple. It has been obscured in Physics education on many levels such as by not properly explaining centrifugal force to students, and by not explaining to students that when they are taught Maxwell's electromagnetic field theory that they are not dealing with Maxwell-Tombe's full force equation, but instead dealing with only the electromagnetic force part of that equation. Unification of Physics is remarkably simple, but bad education on many issues such as those highlighted in this article has confused students, because what they get taught is only half-truths at best. My method in general is to start from Boscovich's unified field theory and see where errors were introduced into the Physics arena. (Note: Maxwell was working from Boscovich's theory.)

[1] Gravitation and the Gyroscopic Force, David Tombe, amended 24 January 2008 : http://www.wbabin.net/science/tombe5.pdf