

## Re: GR ?

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*Source:* <http://sci.tech-archive.net/Archive/sci.physics.relativity/2005-07/msg01105.html>

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- *From:* Tom Roberts <[tjroberts@xxxxxxxxxxx](mailto:tjroberts@xxxxxxxxxxx)>
  - *Date:* Sun, 17 Jul 2005 01:40:07 GMT
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Significant Zero wrote:

ENERGY:- A measure of a system's ability to do work. [...]

That is an old and often not very useful definition.

In modern physics, energy is the conserved Noether current corresponding to a time translation. In systems without time translation invariance, energy is not conserved, and loses much of its usefulness.

In cases where your definition can be used, the new one yields the same answer.

CHARGE :- A property of some \*elementary particles that gives rise to an interaction between them and consequently to the host of material phenomena described as electrical. [...]

Such circular "definitions" are not useful at all.

In modern physics, charge is the conserved Noether current for a global gauge transformation. There are no systems which do not have invariance under such transforms, so charge is always conserved.

#### NOETHER'S THEOREM

Noether's theorem Every continuous symmetry under which the \*Langrangian (or \*Hamiltonian) is invariant in form is associated with a 'conservation law. [...]

Yes. This is one of the most powerful concepts in theoretical physics.

Re: GR ?

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