

Re: A Crazy question for crazy people?

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- *From:* "Sue..." <suzysewnshow@xxxxxxxxxxxxx>
 - *Date:* 4 Jun 2006 16:04:30 -0700
-

guskz@xxxxxxxxxxxx wrote:

Impedance = $R + 90\text{deg } XC - 90\text{deg } XL$

1. XC & XL are simply out of phase(180 deg) but along the same axis which is 90deg from R ?

XC & XL are along the same axis = only 1 axis in spacetime (this is different from #2 below)??

Ahhh... Yeah Fitzpatrick discusses this in the chapter "Advanced Potential?"

<http://farside.ph.utexas.edu/teaching/em/lectures/node28.html>

It seems more a disclaimer than an enlightner. :-)

2. They say XC proportional(related) with electric permittivity & XL proportional with magnetic permeability?

Probably they say that here:

<http://www.conformity.com/0102reflectionsfig3.gif>

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But isn't Electric Permittivity(electron traveling in a wire) & Magnetic Permeability (EM photon wave) are not along the same axis but instead are perpendicular (not 180 deg phase shift) and therefore 90 deg from each other = 2 axis in space (this is different from #1 above)??

Even if I knew how to put that in words it would put 5 cricks in your neck. I'll have to leave it at this:

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This popular figure can be very misleading

<http://web.mit.edu/8.02t/www/802TEAL3D/visualizations/light/Thumbnails/eblightthumb.jpg>

Its spatial fidelity exist only along the direction of propagation.

the other two axes are *representing* magnetic and electric intensity. Note they are drawn in the same phase so the 90 degrees which you see is only for the illustrator's convenience *in this particular graphic*.

Yes... those components are normally represented at 90 degrees. The pitch parameters of a CP helical antenna probably convey more about the near field reactive components.

<http://www.cebik.com/vhf/gh2.html>

An accurate graphic would need details about nearby matter to represent the magnetic component. You can conceive a path with NO magnetic component whose coupling structures are described here:

<http://arxiv.org/abs/physics/0506053>

So where did I do wrong (I thought permittivity was along the same axis as the electric field and travel in space and permeability was perpendicular to both of these = 90 degrees of separation)?

You are trying to do what Oliver Heaviside might have done for us. (He preferred making money down at the telegraph office to throwing pearls before swine)

The near field wave impedance is plotted on 3 axes that don't have an obvious transformation to the 4 axes of Lorenz space-time. because only retarded potential is represented as an imaginary on that CS. Little sine wave wiggles in the near field might be an approximation in Lorenz space.

If you compare the nearfield of a small shielded loop (magnetic coupling $1/r^3$) with the nearfield of an electric dipole (Coulomb coupling $1/r^2$)...

<http://www.conformity.com/0102reflectionsfig3.gif>

....it might be apparent why it is hard to represent the reactive power in the near-field in Lorenz space. (hard to represent does not make it go away)

Eh... not so crazy a question but there is no

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contest and no prize so no reason to disqualify it.

Sue...

Is Bilge bald?