

Electromagnetic wave and photon spin

Source: <http://sci.tech-archive.net/Archive/sci.physics/2006-09/msg01796.html>

- *From:* "rds" <rdschwarz61@xxxxxxxxxx>
 - *Date:* 18 Sep 2006 12:17:19 -0700
-

First off I want to say that I am not physics major.

Can someone explain to me the details of how electromagnetic radiation? Actually occurs. I know the pat answers that the acceleration of charged particles or change in direction, but that doesn't really explain the process.

For that matter why does a magnetic field form when current flows at a constant rate (charge velocity)?

I notice in my car from 0 to 50 MPH , that when I accelerate I feel a pull in the reverse direction, but when I reach the intended speed the pull subsides. In some way this is counter intuitive in that I would assume that the 50 MPH pull would continually cause a drag backwards. In the same manner is this a parallel to the transmission of EM waves? In that I get a transmission (radiation) when charges accelerate or change direction?

Lastly the description of EM wave as abstract photons (all energy no mass) makes sense to me in that the EM wave propagates as an E field (sin) + an M field (cos). Is there an actual difference in the nature of these two fields? Or are they indistinguishable from one another --more like two E-Fields with a 90 degree phase shift

If the latter is true, and we take any point on the EM wave front an examine it as it travels toward us, we could easily describe the EM field as a mass less polarized point in space which rotates like a plate spinning with the top of the plate being positive and the bottom of the plate being negative. The spinning at the rate of the transmission frequency. This totally describes the EM field without even referring to a magnetic field. As the plate rotates its positive to the 3 and 9 o'clock positions it represents the M field peaks, and at the 12 and 6 o'clock position it represents the E field peaks. I would normally call this point a photon and the rotation I would call spin. But I read that photon spin is actually in the direction of travel, and so the spin must be something

Electromagnetic wave and photon spin

different. Any comments clarifications is welcome.

Thanks.....

.