Re: feynman video and photons

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- *From*: "Bill Beaty" <billb@xxxxxxxxxx>
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Ancient_Hacker wrote:

> For a Nobel prize, please explain how an electromagnetic wave, spread out evenly over a square meter, can cause one electron to jump out.
>
> For a second prize, explain why the electron sometimes jumps out after 1/10th of a second, when the electromagnetic wave hasnt delivered a full second's worth of energy,

You're wrong; those aren't Nobel−grade discoveries... and apparently both
were made decades ago and are long known by physicists. The photoelectric
effect is not proof of photons. Heh. Everything we know, is wrong.
See:

Lamb W E and Scully M O 1969
The photoelectric effect without photons
Polarization, Matiere et Rayonnement edn
Soci´et´e Fran¸caise de Physique
(Paris: Presses Universitaires de France)

That "Lamb" is WIllis Lamb, who got the Physics Nobel in 1955

Some physicists even complain about the misconceptions spread by undergrad
texts, such as the misconception that "Einstein's photoelectric effect proves
the existence of photons." In fact the photoelectric effect can be explained by
Classical EM fields if we allow vacuum fluctuations to exist. Photons may
exist, but it takes a much more subtle experiment to prove this. A good article
on this topic is by the author of the textbook "Quantum Optics" and is found
in the collection below:

The concept of the photon−revisited
A. Muthukrishnan, M. Scully, M. Zubairy

Found in "The Nature of Light: What Is a Photon?"
Oct 2003 Optical Soc. of Am, Optics/Photonics News
http://www.osa−opn.org/abstract.cfm?URI=OPN−14−10−49

Other papers in the above collection are excellent. The discuss the real
evidence for photons, and get us questioning the old incorrect textbook stuff
were taught never to question ...and force us to (gasp) Actually Think!

Lest you assume that Lamb's paper was the last on this topic, please be aware that physicsts are STILL arguing over whether EM fields are quantized
(whether photons actually exist,) and are still looking for experiments which
supply an unequivocal answer. Zubairy mentions that these issues are discussed in Quantum Optics, but I've never tracked that one down. The whole OPA/OSN collection above has lots on this. And a quick google search turns up a recent paper from 2001:

Proposed experiment to test photon anticorrelation with quantitatively controllable source emission rate
http://ej.iop.org/links/q50/5U25DXuTmMzsTPFxBvezCg/ob1411.pdf
Abstract
We describe a proposed experiment that will establish whether or not the
optical field is quantized. We argue that previous attempts to establish this
have not been conclusive. Quantum optics and Maxwell electrodynamics predict different outcomes for the experiment which is an improved version
of that performed by Brown and Twiss in 1956 (Nature 177 27−9). The Brown−Twiss experiment did not distinguish between the two theories because its source was classical. In the proposed experiment, a weak light
signal is achieved without selective deletion, and it can be either Poissonian
or sub−Poissonian.

Myself, I believe in photons 90%, but have learned enough that I wouldn't
be suprised if EM fields turn out to be real, and photons turn out to be
a big and long−running mistake. The last big mistake was the Aether theory which was shot down by photons. It would be quite ironic if

the physicists of a hundred years hence become convinced that neither
Aether nor photons exist. :)

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