

# Re: The time it takes to emit one photon

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- *From:* Eugene Stefanovich <[eugenev@xxxxxxxxxxxxx](mailto:eugenev@xxxxxxxxxxxxx)>
  - *Date:* Sat, 24 Sep 2005 16:09:55 +0000 (UTC)
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nightlight wrote:

>>DOUBLE-SLIT

>>

>>This is called interference. If you think this experiment  
>>can be explained without the notion of photons and their  
>>quantum-mechanical behavior, I would like to hear your  
>>explanation.

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> The classical EM field produces the same interference pattern of  
> intensity variation across the screen. Therefore the interference  
> pattern alone would be entirely unsurprising to Maxwell. How would you  
> surprise him?

I think Maxwell would be surprised to see that low-intensity light produces small flashes on the screen. I think Maxwell imagined the light passing through the slits as a continuous wave. He would expect to see a continuous diffuse image on the screen. When the intensity of the source goes down, he would expect that the brightness of the image would also go down correspondingly until the point when the amplitude of the field is too low to excite detectable charge vibrations on the screen (or whatever was Maxwell's model for creation of the image on the scintillating screen).

I think Maxwell would be very much surprised that instead of this gradual decrease of the brightness, one can discern clearly very small flashes on the screen. The brightness of each flash does not depend on the total intensity of the light source. When the intensity of the source goes down, the frequency of flashes goes down, not their brightness.

If Maxwell would stick to his continuous-wave approach, he would be forced to admit that upon interaction with the screen the light wave somehow collapses to a point, and the place of the collapse is unpredictable. He would probably even invented photons and quantum mechanics in order to deal with this paradox.

Eugene.

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