Confusing Copenhagen Complementarity

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It is demonstrated that the reason to the wave or particle confusion was produced already when Maxwell introduced the wave model for light. Einstein did not produce the first contribution to this confusion although he produced other errors. When light is observed in a telescope, or in an interferometer, the *observed* direction of light is independent of the ether wind.

1. The Wave Model for Light

The wave model demands an ether to do the waving. The *real* motion of light can therefore be described as a vector sum of wave vector **c** and ether wind **v**. Maxwell assumed an ether but did not regard the ether wind **v**. The vector sum **c**+**v** is relevant for focused light where the centre of a beam can (theoretically) be detected and demonstrated to be dependent on v_t (the transverse component in the ether wind). However, wave front orientations inside such a beam are *not* changed by v_t blowing *inside* the planes of these wave fronts because the effect is the same over the wave front. Since the telescope detects unchanged orientations the transverse ether wind v_t cannot be detected and is irrelevant to the telescope. Therefore, the *observable* motion in a telescope is $\mathbf{c}(1+v_c/c)$ (v_c is component in **v** parallel to **c**), as long as we observe not focused light. Orientation of wave fronts can only be changed by different values in v_c in different points in the wave front. That is by a gradient in v_c and not by v_t. The telescope detects the normal to the wave fronts as observable motion and not real motion. $\mathbf{c}(1+v_c/c)$ and not **c**+**v**. The distinction between real and observable direction is important. The irrelevance of v_t in a telescope means that stellar aberration provides *no information* about the ether wind.

The description $\mathbf{c}(1+v_c/c)$ is relevant for interferometers as well. In an interferometer wave front orientation is defined by mirrors and always parallel to these mirrors independent of **v**. Therefore, v_t is irrelevant in interferometers as well. Only longitudinal component v_c is relevant in interferometers. v_t cannot reduce Michelson's prediction, as Stokes said, and not produce time dilation, as Einstein said.

2. Stellar aberration

Bradley explained stellar aberration based on the particle model for light. An observer changing his own motion from zero to u_t in a direction transverse to light motion will observe light motion to appear changed an angle $arctg(u_t/c)$. This follows from transformation of coordinate systems. We can also see this effect by regarding the telescope's motion during the time it takes light to move from refractor to detector. The effect can also be described by an observer, not knowing his own change in motion, and therefore assume that the observed phenomenon has changed instead. This effect in a moving telescope is independent of if a wave or a particle is moving from refractor to detector. A not changed particle track or a not changed wave front normal is *apparently* changing in the same way when the real change is in the observer motion. Therefore, Bradley's derivation for light particles is valid for light waves as well and observer motion u_t is relevant. (We have earlier seen that v_t is *not* relevant.) Therefore, a *gigantic mistake* was done when the assumed cause of stellar aberration was shifted from u_t to v_t in connection with the introduction of the wave model for light. The entrained ether was therefore refuted on *false* grounds. The existence of waves was used to exclude the existence of the waver. An absurdity reported to NPA many times.

3. The Particle Model for Light???

Einstein promoted a comeback for Newton's light particles by means of observations on matter in the form of discrete electrons in the photoelectric effect. These particles produce quantization and we can therefore not conclude quantization to exist *before* detection. Instead of these absurdities we can easily explain the photoelectric effect according to the wave model for light. Incoming light waves can interfere with blackbody radiation from *bound* electrons. Bound electrons generate wave functions (including harmonics) which can interfere with incoming light waves. This is possible if $f(light) \approx n f(orbit)$. The electron will thereby experience a changed force transverse to motion, and the electron's orbit is disturbed. This means a change in *potential* energy. This energy comes probably from the ether. The electron's kinetic energy is *not* changed and must therefore exist before the photoelectric effect phenomenon.

These new assumptions imply a demand for *high* kinetic energy in bound electrons to make this interaction with light possible. This demand is more realistic than the common assumption that almost stationary electrons exist on the surface of a conducting crystal. The demand for high speed can explain $\Delta E=hf$. In this relation f represents a wave property which Einstein used to 'prove' a particle property. This was a mistake.

4. Conclusions

Real motion of light is **c**+**v**. However, Observable motion of light in telescopes and interferometers is $\mathbf{c}(1+v_t/c)$. Transverse ether wind v_t is irrelevant in most kinds of experiments. Stellar aberration can therefore not rule out the entrained ether.

The photoelectric effect can be described by the wave model for light and by interference effects. We do not need the particle model for light.

[1] John-Erik Persson, "The Falling Ether", Proceedings of the NPA 2013 available at www.worldsci.org/people/john-erik_persson