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Three Great Mistakes of Quantum Theory

1. **Mistake #1; Retention of the classical physics view of what is real:**

The founders of quantum theory inherited physical objects, quantities and dimensions from classical physics that were defined and arranged in a naïve, vision-centric way. Mass in space dominated along with the equations representing them. Energy was a mere quantity and time a simple metric. There was no way the equalities of special relativity – mass with energy, space with time – could be accommodated within this view of what is real. Radiation and time had to fit in as best they could and the result was a set of paradoxes: wave-particle duality, the constant speed of light and no physical explanation for either photon probability or photon wave collapse. Physics remained particles physics, i.e., mechanics in all its iterations: classical mechanics, fluid mechanics, celestial mechanics, statistical mechanics and quantum mechanics.

2. **Mistake #2; Treating the photon as a particle because of its reception at a point:**

We have absolutely no proof of the massless photon as a particle; we are simply making an analogy with rest mass impacting at a point. The photon makes the world's worst particle. Unlike a real particle the photon has no mass, no trajectory, doesn't take up space, can't be motionless in space (like any particle can), can't be described by the wave function and violates Galilean relativity. In spite of all this, our (classical) theory of what is real requires that the photon be a particle.

See: "Is the Photon Really a Particle?" Optiks vol. 237" – revised at: https://philpapers.org/archive/KLEPTA-3.pdf

3. **Mistake #3: Ignoring latent identities:**

The classical and quantum view of change (causation) is that a particle's payload of energy or force acts upon the material target it strikes. Even the forces of fields are assumed to obey this simple process, naïvely derived from common experience of impact (somehow "impact" can yield attraction as well as repulsion for fields).

But stationary entities do not undergo impact and they have their own, unique causation. An inertial, space-stationary particle, say the carbon-14 atom, undergoes a probabilistic change-of-state (decay) at a random time location. And the time-stationary, in-flight photon undergoes a probabilistic change-of-state (reception, termination) at a random space location. The two cases are inversely symmetrical – and hence formally equivalent – providing we take the equalities of special relativity seriously: energy as the equal of mass, time as the equal of space. In both cases the change-of-state is caused by a latent, internal, probabilistic process navigating a dimension; no mechanics, no payloads.

It is latent identities of objects (photon and electron) that bring objective probability into physics (into radiation and into the microworld) The mechanics of classical and quantum physics ignore latent identities and hence they cannot account for probabilistic change-of-state (termination) nor for its side effect, collapse

These concepts require a longer exposition to fit them together and be comprehendible. Meet the challenge and work your way through their full development:

Duality Underpins the Wave Function, Nonlocality and the Measurement Problem:
But Progress May be Possible
https://philarchive.org/archive/KLEDUT