HISTORICIZING THE VIRTUAL

A Promising Methodology and a Study of the Ether

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Index

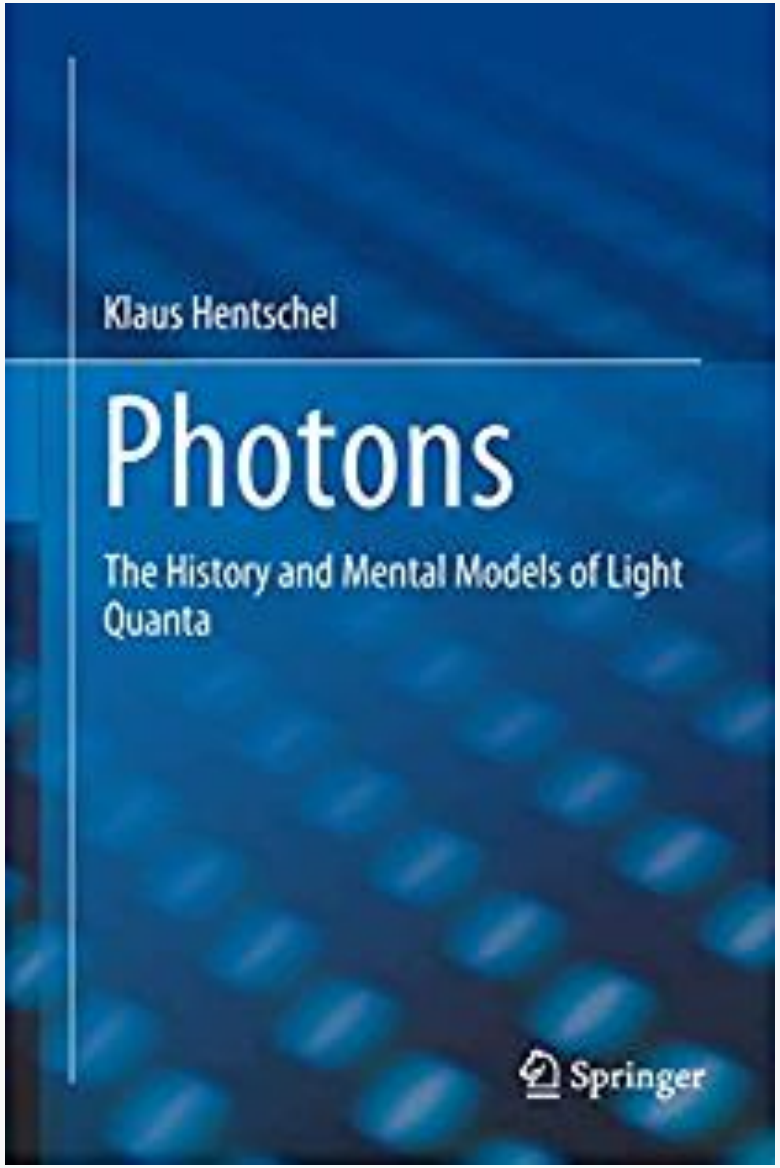
1. What does virtual mean?

- Has different meanings in philosophy, computer science, physics, etc.
- Two possible definitions in physics:
  - *A) "denoting particles or interactions with extremely short lifetimes and (owing to the uncertainty principle) indefinitely great energies, postulated as intermediates in some processes" (Oxford English Dictionary).*
  - *B) "of, relating to, or being a hypothetical particle whose existence is inferred from indirect evidence" (Merriam-Webster Dictionary).*

- I choose B) → Wider range of things to talk about
  → Shared problem: transtemporal identification

2. *Semantic layers* as historical methodology

- Klaus Hentschel (2018). *Photons: The History and Mental Models of Light Quanta.*
- Concept formation as layered semantic accretion.
- Semantic layers: individual meanings or properties that a concept holds for a time.



2. *Semantic layers* as historical methodology

Features:

- Distinction → *concepts* vs. *terms*.
- Semantic layers may appear before the term is coined.
- Concepts do not follow a specific path of development (continuity/discontinuity).
- Not plain accumulation of semantic layers → complex interplay.

2. *Semantic layers* as historical methodology

Concerning virtual entities:

- Concept centred history → virtual entities' layers may appear before the term does.
- Separates the different meanings a concept develops over time, especially useful for the highly mutable and many-sided virtual entities
- Aware of the complexity of the historical processes by which virtual entities develop.

3. The many deaths of the ether

- Traditional historiography:
  - *Ether was abandoned after Einstein's Theory of Special Relativity.*
  - *Michelson-Morley negative results refute the existence of the ether.*
  - *Paradigmatic case of Kuhnian revolution or Popperian falsification.*
- Recent historiography (Navarro 2020, *in press*):
  - *Ether was abandoned because it did not acquire enough robustness due to its many different meanings.*
  - *Early obituaries of the ether created a new object: the non-existing ether.*

3. The many deaths of the ether

The semantic layers of “ether”

1. Ether is a stream of particles that carry bodies along with it.
2. Ether is a fluid that flows from one body to another.
3. Ether is an atmosphere formed around bodies.
4. Ether is a dynamical medium whose density determines bodily motion.
5. Ether is a (quasi-)stationary medium that explains the transmission of light waves.
6. Ether is a perfect fluid composed by stable vortex rings that form atoms.
7. Ether is a mechanical medium that explains the transmission of electromagnetic waves.
8. Ether is the absolute stationary space that works as an absolute frame of reference.
9. Ether is a stationary, abstract medium that can serve as a preferrable frame of reference.
10. Ether is a space with qualities, but non-mechanical ones.
11. Ether is the quantum vacuum that shows physical properties.

3. The many deaths of the ether

What the semantic layers tells us about the ether:

- The ether had multiple meanings, some of them contradictory, some of them unrelated.
- The ether was so many things that maybe was nothing at all.
- Instead of adding new properties, it gradually lost them until being almost empty.
- A new, simplified version of the ether was declared dead.
- Scientific revolutions or falsification do not account for the complex history of the death of the ether.

4. Conclusion

- The plethora of semantic layers of the ether may explain why it did not reach enough robustness and died.
- The traditional accounts of the death of the ether do not grasp the historical and conceptual complexity of its abandonment.
- The semantic layers methodology might offer a better perspective for such complex developments, and might be useful for other virtual entities.

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