The Radiation Problem

www.radiationproblem.com

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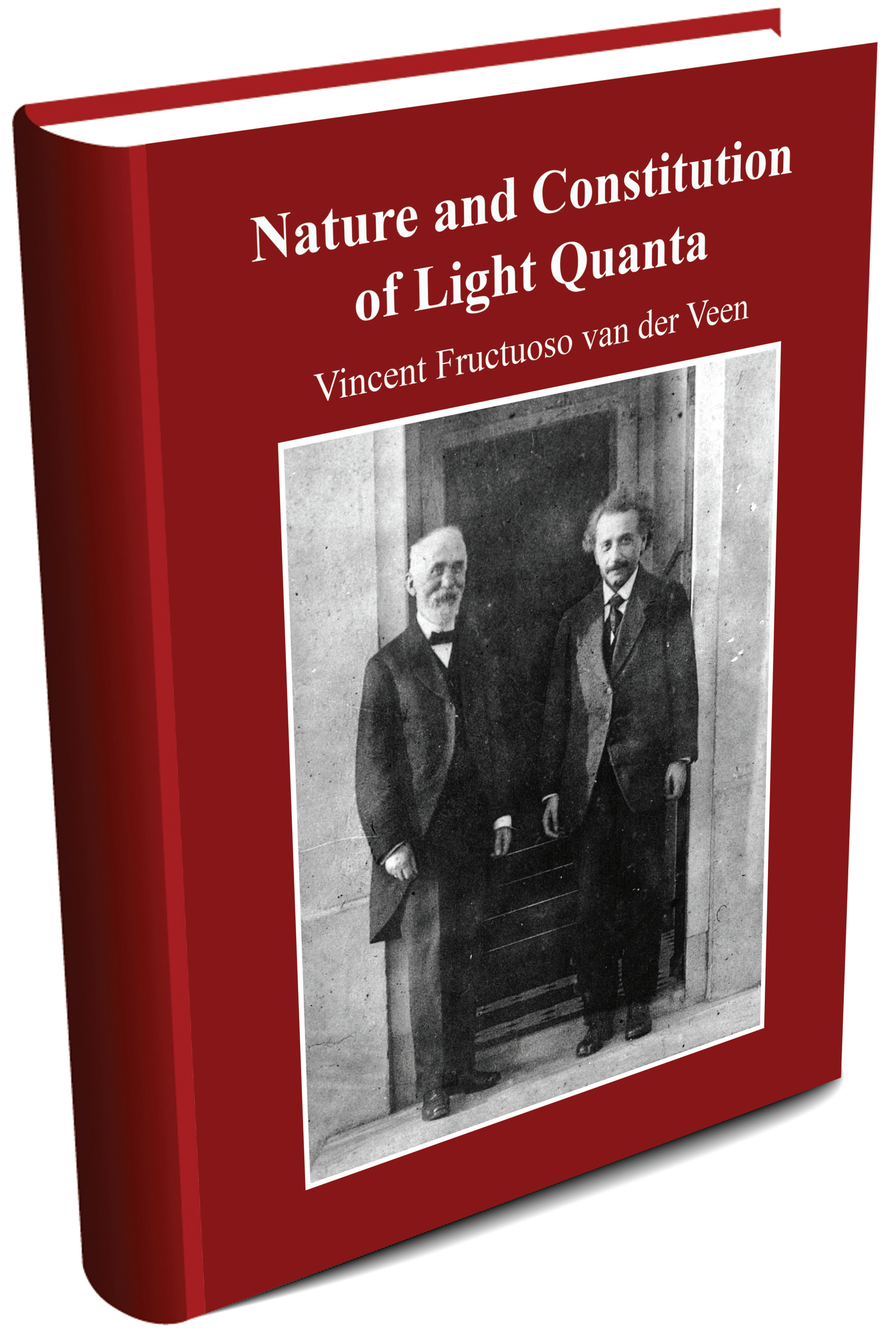


Introduction

The radiation problem is how Einstein called his search for a complete electro-magnetic theory[1]. How to deal with the following aspects?

- Quanta and waves
- Relativistic, classical and quantum mechanical viewpoints
- Free radiation and the heuristic principle (interaction of light with matter)
- Emission and absorption points of view[2]

My book[3] provides a solution by presenting a new photon model.

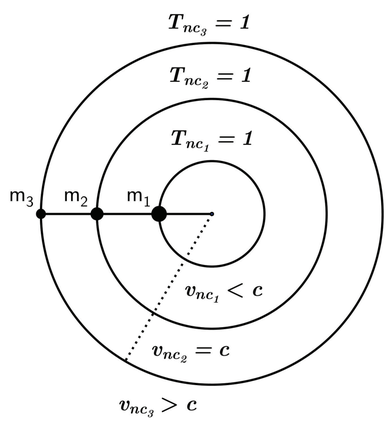
Method

1. Design of standard clocks with Uniform Circular Motion (UCM)
   - Radius r is the hand of the clock and the rotating point is the tip of the hand
   - Instead of ordinary hour clocks (T = 1 hour) we create 'second' clocks (T = 1 second)
2. Framing of the cyclical electromagnetic oscillation with UCM
   - Electrical and magnetic oscillation are described together for any monochromatic wavelength, which is rolled into a circle ($r = \lambda / 2\pi$)
   - The rotating point represents the total theoretical mass of the photon according to the mass-energy equivalence (since m = 0 is assumed)

Two complementary design procedures (denoted 'nc' and 'ec')

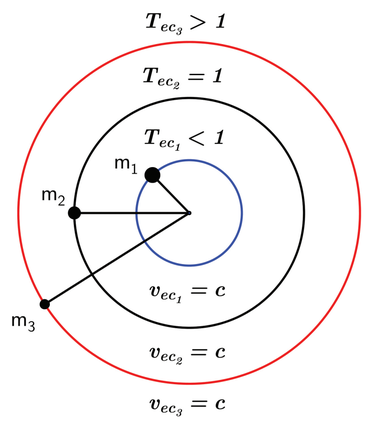
Design of Clock system A (or "0"): identically functioning clocks

- Principle of constant angular velocity: ω = constant, v = variable
- T = 1 second, for any clock size ($\omega = 2\pi$ rad/s)



Design of Clock system B (or "1"): differently functioning clocks

- Principle of constant velocity: ω = variable, v = constant
- T = 1 second in one case only (v = c)



New principle of constant angular velocity

1. Absolute simultaneity of events; general time (with further specification[4])
2. Elaboration of the Light-Quantum hypothesis[1]:
   - 'the quantum is only generated as a whole and it moves without dividing'
3. Infinite combinations of $h \approx mv^2$: Planck constant is configured in infinitely many different sizes
4. Emission point of view: state of free radiation, so prior to interaction in a vacuum
5. Theoretical distribution of velocities
6. Time-independent space-time: no relation between r and T beforehand

Equations of free radiation:

$v_{nc} = (2\pi * r) / T_{nc} = \lambda / T_{nc} = \lambda * f_{nc}$ (also linear propagation, 2π is cancelled out)
$E_{nc} = (h * v_{nc}) / \lambda = f_{nc} * h = \omega_{nc} * \hbar$
$p_{nc} = E_{nc} / v_{nc} = (f_{nc} * h) / (\lambda * f_{nc}) = h / \lambda$

Existing principle of constant velocity (the postulation of v = c)

1. No simultaneity of events ('relativity of simultaneity'[4]); local time[4] in terms of (v / c)
2. Elaboration of the Planck postulate:
   - $E = n * (\hbar * \omega_o)$ with $n = (c / v_{nc})$ and ω_o the oscillation of the ground state
3. Just one combination of $h \approx mc^2$
4. Absorption point of view: state of interaction as measured in a vacuum
5. Theoretical distribution of frequencies
6. Time-dependent space-time: after assuming v = c there is a relation between r and T

Equations of interaction of light in a vacuum:

$v_{ec} = c = (2\pi * r) / T_{ec} = \lambda / T_{ec} = \lambda * f_{ec}$ (also linear propagation, 2π is cancelled out)
$E_{ec} = (h * v_{ec}) / \lambda = f_{ec} * h = \omega_{ec} * \hbar$
$p_{ec} = E_{ec} / v_{ec} = (f_{ec} * h) / (\lambda * f_{ec}) = h / \lambda$

Label-irrelevant Twin (A = B: the Ground State)

- Systems A and B (i.e. the states of system "0" and of "1") represent two separated types of space-time, whilst retaining the equations for the propagation of radiation, energy and momentum[2]
- However, there is one Twin State ($T_{nc} = T_o = T_{ec}$, $E_{nc} = E_o = E_{ec}$) which is the basis for the entanglement and transformation. The Twin State is the Ground State: the single state to which T = 1 second applies in both systems A and B. This special quantum state is part of system A and of B, though the distinction between A and B is not possible (A = B, states "0" and "1" apply at the same time). It is also the state of rest ($v_{nc} = c = v_{ec}$). Only for this match the two clock systems A and B are synchronized. It is the preferred frame
- In system A all monochromatic photons are just different superpositions of this single Ground State. Upon interaction relativistic effects in terms of (c / v) cause different frequency and energy levels in system B for all other photons

Summary/more information

The photon model is a new quantum system that solves many theoretical problems of which some were mention in the introduction (for example, there is no relativistic theory of light itself which is connected to the Light-Quantum hypothesis and also covers the emission point of view). The model particularly gives new insights into the Abraham-Minkowski controversy and Ehrenfest paradox. The book provides detailed information about the presented solution to the radiation problem. It delves deeper into interpretation and related topics as: conservation and transformation laws, quantum teleportation, the concept of mass.

Request: I would like to jointly prepare a scientific article on the radiation problem and the solution offered.

1 Einstein (1905), Annalen der Physik 17 (6): 132-148 • **2** Einstein (1909), Physikalische Zeitschrift 10: 817-825 • **3** Fructuoso van der Veen (June 2015) • **4** Lorentz (1895), E.J. Brill, p 4