The photon to electron/positron-pair transition

A. Meulenberg,*[a,b] R. F. Penland[b] and W. R. Hudgins[a]

[a] Science for Humanity Trust, Inc., New Market, Maryland, 21774, USA
[b] Science for Humanity Trust, Bangalore, India, 560003

Our prior work has discussed the solitonic nature and interference of photons and light.[i,ii,iii,iv,v] This work addresses the interference of photons with themselves and the conditions under which a specific resonance creates the entangled electron/positron pair. Analysis of the forces and potentials in the interaction between photons has raised the issue of oscillating charge as the source of the alternating electric and magnetic fields composing the photon.[vi,vii] Since the photon is net neutral yet is composed of electric fields, The object of this paper is to explore how the alternating fields of the photon are 'rectified' to produce the separated opposite charges of the electron and positron (both leptons) pair. Since the leptons have a unique charge and rest mass, they, like the source photon(s), must also be solitons. The conditions for resonance must be very tight.

Physics spent more than 50 years deciding that the lepton mass is entirely electromagnetic. Nevertheless, the concept of the electron being a bound photon has never been acceptable. The electron/positron pair creation and annihilation processes are considered to be a 'black-box' interaction or quantum-mechanical 'magic'. Since photons are here[vi] considered to be resonant oscillations (solitons) of an undefined 'field' in four dimensions, we must also look to the 4th dimension to resolve the charge separation. The photons' constituent EM fields are modes of this oscillation. It is in the context of the standing waves of photons that the EM fields and potentials lead to a description of alternating (AC) 'currents' (of some form) of unquantized alternating 'charge' (of some sort) that can be rectified into two coupled (at least initially) resonant bodies with charge and, now, with restmass.

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[i] W. R. Hudgins, A. Meulenberg, S. Ramadass, "Evidence for unmediated momentum transfer between light waves," Paper 8121-39, presented at SPIE Optics + Photonics 2011, Conference 8121 The Nature of Light: What are Photons? IV, 21 - 25 August 2011, San Diego, CA USA

[ii] W. R. Hudgins, A. Meulenberg, and R. F. Penland, "Mechanism of wave interaction during interference," Paper 8832-6, presented at SPIE Optical Engineering + Applications, 25 - 29 August 2013, San Diego, CA

[iii] A. Meulenberg, "Mechanism of photonic interaction," Paper 8832-6, presented at SPIE Optical Engineering + Applications, 25 - 29 August 2013, San Diego, CA

[iv] W. R. Hudgins, A. Meulenberg, and R. F. Penland, "Wave interference: mechanics of the standing wave component; and the illusion of 'which way' information?" this conference.

[v] A. Meulenberg, "Creation and fusion of photons," Paper 8121-29, presented at SPIE Optics + Photonics 2011, Conference 8121 The Nature of Light: What are Photons? IV, 21 - 25 August 2011, San Diego, CA

[vi] A. Meulenberg, W. R. Hudgins, and R. F. Penland, "The photon: EM fields, electrical potentials, and AC charge," this conference.

[vii] A. Meulenberg, "The photonic soliton," Paper 8832-22, The Nature of Light: What are Photons? V (OP301), presented at SPIE Optical Engineering + Applications, 25 - 29 August 2013, San Diego, CA