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Quantizing Dynamics

Akira Kanda[1], Mihai Prunescu[2] and Renata Wong[3]

[1] Omega Mathematical Institute/University of Toronto, Toronto, Ontario, Canada
[2] University of Bucharest, Romanian Academy of Science, Bucharest, Romania
[3] Department of Computer Science and Technology, Nanjing University, Nanjing, China

E-mail: kanda@cs.toronto.edu, mihai.prunescu@gmail.com, renata.wong@protonmail.com

Abstract. In theoretical physics, quantization means reducing a continuum structure to a discrete structure. This process became victorious in the development of quantum mechanics since Planck's "convention" of the discretization of the energy of electromagnetic waves $e = nhf$ as a "solution" to the crisis of the blackbody radiation. When combined with Einstein's relativistic particle energy equation $e = mc^2$, it became a most fundamental process of the 20th century theoretical physics. Planck was reluctant to consider his energy quanta $e = nhf$ as a physical particle. His concern was completely overridden by the majestic success of quantum mechanics, which was Einstein's relativity theory dynamics combined with Planck's wave particle duality. This "success" was expanded by Dirac into the quantization of the entire EM field theory of Maxwell in which the electromagnetic fields - mathematically of a continuum structure - were quantized in terms of Einstein's special theory of relativity dynamics using Fourier expansions. As the mathematical error of using wave numbers, which form a real continuum, as indexes of the Fourier expansion for the discretization of waves was never noticed by the community of mathematical physics, this quantization of electrodynamics, aka "QED" became a model for further quantizing continuum-based physical theories. This fatal error was passed on to all of the successors of QED. This fundamental error of QED naturally blocked any potential success of the general quantum field theory. Quantum Gravity Theory is yet another attempt to quantize a major force field theory of gravitational forces. Due to the issue of the difference between the continuous and the discrete, this ambitious project is doomed. In general, it is pointless to try to quantize a continuum field theory. This is partly the reason why modern day mathematicians keep an honorable distance with regards to the 20th century theoretical physics.