A New Case for Direct Action

Michael Ibison
Institute for Advanced Studies at Austin
11855 Research Boulevard, Austin, TX 78759, USA
ibison@earthtech.org

In this talk I will try to argue that the direct action version of electromagnetism is deserving of further scrutiny, hitherto having been unfairly maligned and prematurely discarded. I will offer novel solutions to two of the problems that have thwarted the theory, namely (i) It did not fulfill its initial promise of avoiding the problem of infinite (Coulomb) self-action and self-energy in the Maxwell theory of the classical point charge; and (ii) It was found that the cosmological boundary condition identified by Wheeler and Feynman as necessary in order to explain the predominance of retarded radiation could not be met by any reasonable cosmology.

A third obstacle has been purely philosophical and may be more difficult to counter: spacetime is traditionally conceived as a pre-existing canvas 'in which things exist and events take place', and which is therefore logically prior to those 'things and events'. In direct action however, spatio-temporal location appears only as a *quality* of 'things and events', in the same sense that electric charge is a quality of an electron, and green is a quality of an apple. In direct action the spacetime continuum has only the status of a mental construction - a chart of possible quality-values.

But the traditional conception of spacetime forces us to adopt theories that involve addition, subtraction, and multiplication of infinities in order to get a finite result. They demand that the spacetime canvas be filled with infinite energies (of either sign), requiring an implausible cancellation of infinities to get the observed Cosmological Constant, an infinite mass renormalization, and an infinite dimensional Fock space - just to describe radiation from a single H atom.

I suggest that the price of all of this is too high and therefore that direct action deserves a second look. And I believe that William of Ockham would agree.