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What is the best way to quantize non-linear electrodynamics?

Generalized Proca (GP) is a class of non-linear, massive electrodynamics theories, first proposed in [Heisenberg, 2014]. As a classical effective field theory, GP rapidly became prominent in the context of cosmology. As a quantum field theory GP has immense potential to describe phenomena in condensed matter, optics, and particle physics. In our recent work, we quantized a family of GP theories using the symplectic approach, featuring two main advantages: it is algebraically simple and its outcome is amenable to numerical simulations. Additionally, by unveiling the existence of quantum consistency conditions, we conclude that not all classically well-defined (multi-)GP theories are amenable to quantization, and discuss a generalization of our results.

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