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

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A class of non-linear, massive electrodynamics theories known as Generalized Proca (GP) was proposed in 2014 in the context of classical effective field theories and has held a prominent role in cosmology. As a quantum field theory GP has the potential to describe phenomena in condensed matter, optics, and lattice field theories. In this talk, we show how to quantize 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 the implications of our results.

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