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Gauge Independent Effective Field Equations SANJIB KATUWAL, RICHARD WOODARD, University of Florida — Were it not for gauge dependence, the vacuum polarization could be used to quantum-correct Maxwells equations so that quantum gravitational corrections to electromagnetism could be studied the same way we understand classical electrodynamics. The received wisdom is that, no matter how small quantum corrections are, they can only be inferred using the gauge independent S-matrix. In this talk I demonstrate how gauge dependence can be removed by accounting for the quantum gravitational interactions of the source which disturbs the effective field and the observer who measures this field. The result is a set of gauge-independent effective field equations which can be studied in complete analogy to classical electrodynamics.

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