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Renormalization of Second Order Formalism for Spin 1/2 Fermions

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Abstract content

We study the one loop renormalization of the electromagnetic interactions of a second order formalism for spin 1/2 fermions arising from projectors onto invariant subspaces of the Poincaré group. Using dimensional regularization and the mass-shell subtraction scheme it is shown that the vacuum polarization, fermion self energy and vertex interactions associated with the interacting Lagrangian are free of divergencies at this order. In this formalism the gyromagnetic factor g is a free parameter. We find that for general g this parameter must be renormalized and impacts the running coupling constant $\alpha_s(Q^2)$. For the value $g=2$ we recover the conventional results of the Dirac formalism.

Summary

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