

Gauge Invariance and Finite Counterterms in Chiral Gauge Theories

Thursday 16 June 2022 15:00 (30 minutes)

We derive the finite one-loop counterterm required to restore the Ward Identities broken by the regularization scheme in chiral gauge theories. Our result is an analytic expression applicable to a wide class of regularizations satisfying a few general properties. We adopt the background field method, which ensures background gauge invariance in the quantized theory, and focus on renormalizable chiral theories with arbitrary gauge group and fermions in general representations. Our approach can be extended to theories involving scalars, such as the Standard Model, or to non-renormalizable theories, such as the SMEFT. As a concrete application, we work out the finite counterterm at one loop in the Standard Model, within dimensional regularization and the Breitenlohner-Maison-'t Hooft-Veltman prescription for γ_5 .

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