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Torsional regularization and finite bare charge

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We show that in the presence of the torsion tensor $S^k{}_{ij}$, whose existence is required by the consistency of the conservation law for the total angular momentum of a Dirac particle in curved spacetime with relativistic quantum mechanics, the quantum commutation relation for the four-momentum is given by $[p_i, p_j] = 2i\hbar S^k{}_{ij} p_k$.
We propose that this relation replaces the integration in the momentum space in Feynman diagrams with the summation over the discrete momentum eigenvalues.
We derive a prescription for this summation that agrees with convergent integrals:
$\int \frac{d^4p}{(p^2+\Delta)^s} \rightarrow 4\pi U^{s-2} \sum_{l=1}^{\infty} \int_0^{\pi/2} d\phi \frac{\sin^4\phi \, n^{s-3}}{[\sin\phi + U\Delta n]^s}$,
where $n = \sqrt{l(l+1)}$ and $1/\sqrt{U}$ is a constant on the order of the Planck mass, determined by the Einstein-Cartan theory of gravity.
We show that this prescription regularizes ultraviolet-divergent integrals in loop diagrams.
We extend this prescription to tensor integrals and apply it to vacuum polarization.
We derive a finite, gauge-invariant vacuum polarization tensor and a finite running coupling that agrees with the low-energy limit of the standard quantum electrodynamics.
Including loops from all charged fermions, we find a finite value for the bare electric charge of an electron: $\approx -1.22\, e$.
Torsional regularization, originating from the noncommutativity of the momentum and spin-torsion coupling, therefore provides a realistic, physical mechanism for eliminating infinities in quantum field theory: quantum electrodynamics with torsion is ultraviolet complete.

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