

Dynamical Lorentz symmetry breaking in four-fermion models

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In the context of four-fermion models, we explore the possibility that radiative corrections can lead to spontaneous Lorentz symmetry breaking. Our study of the effective potential reveals that certain currents, expressed as $\bar{\psi} i \partial_{\mu_1} \dots i \partial_{\mu_p} \gamma^{\mu_1 \dots \mu_n} \gamma_5^q \psi$, may acquire non-zero vacuum expectation values, thereby triggering Lorentz violation. We demonstrate that Lorentz invariance may be restored at given finite temperatures. Additionally, we calculate the effective action and the corresponding bumblebee-like potentials. Ultimately, we establish a link between these potentials and the terms of the standard model extension.