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CP-odd static electromagnetic properties of the W gauge boson and the t quark via the anomalous tbW coupling.

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Abstract content

In the framework of the electroweak chiral Lagrangian, the one-loop induced effects of the anomalous tbW coupling, which includes both left- and right-handed complex components, on the static electromagnetic properties of the W boson and the t quark are studied. The attention is focused mainly on the CP-violating electromagnetic properties. It is found that the tbW anomalous coupling can induce both CP-violating moments of the W boson, namely, its electric dipole ($\tilde{\mu}_W$) and magnetic quadrupole ($\tilde{Q}_W$) moments. As far as the t quark is concerned, a potentially large electric dipole moment (d_t) can arise due to the anomalous tbW coupling. The most recent bounds on the left- and right-handed parameters from B meson physics lead to the following estimates $\tilde{\mu}_W$ $10^{-23} - 10^{-22}$ e-cm and $\tilde{Q}_W$ $10^{-38} - 10^{-37}$ e-cm^2, which are 7 and 14 orders of magnitude larger than the standard model (SM) predictions, whereas d_t may be as large as 10^{-22} e-cm, which is about 8 orders of magnitude larger than its SM counterpart.

Summary

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