

Consistency of a Lorentz-violating extension of the photon sector

Lorentz symmetry is one of the fundamental cornerstones on which the Standard Model of elementary particle physics is based. However, toy models of physics at the Planck scale, such as space time foams, lead to Lorentz symmetry breaking. In the low energy limit such a violation of Lorentz invariance can be described in the framework of an effective quantum field theory. Background fields are introduced that manifestly break Lorentz symmetry and lead to a deformation of the Standard Model.

A modified quantum electrodynamics (QED), which describes a violation of Lorentz invariance in the photon sector, is on the focus. The Lorentz-violating part of the theory is characterized by 19 free parameters. Some sectors of this modified QED are especially interesting from a physics point of view. These have been examined with respect to consistency concerning properties such as microcausality and unitarity. The results of that analysis will be presented and conclusions made.

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