

Название публикации:

Violation of the Equivalence Principle in Non-Hermitian Fermion Theory

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Аннотация:

Consequences of the non-Hermitian expansion of the Dirac equation in which the mass term is written in the form $m \rightarrow m_1 + \gamma_5 m_2$ are considered. It is shown that such procedure inevitably leads to violation of the weak equivalence principle, i.e., causes an inequality of gravitational and inert fermion masses. However, if to relate the Hermitian, m_1 , and non-Hermitian, m_2 , masses by the additional condition $m_2/m_1 = m_1/2M \leq 1$, the possibility arises to preserve the equivalence principle for fermions of the standard model with high accuracy. In this case, the parameter $M = \text{const}$ is the universal constant with dimensionality of mass that can be related to a maximum possible allowed fermion mass in this model. As a consequence of the same condition, a new class of solutions of the modified Dirac equation arises that describes particles whose properties make them obvious candidates for dark matter. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Ключевые слова:

dark matter, modified Dirac equation, non-Hermitian expansion, violation of the equivalence principle