

# Fermion with Three Mass Parameters

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Ключевые слова: Lorentz group, extended sets of representations, generalized wave equation, fermion, mass parameters, electromagnetic field, gravitational field.

Аннотация: In the chapter, starting from a 20-component wave function in general Gel'fand-Yaglom approach a new wave equation for spin 1/2 fermion, which is characterized by three mass parameters, is derived. In absence of external field, three involved bispinors obey three separate Dirac-like equations with different masses  $M_1$ ,  $M_2$ ,  $M_3$ . In presence of external electromagnetic fields or non-Euclidean background with nonvanishing Ricci scalar curvature, the main equation is not split into separated equations, instead a quite definite mixing of three Dirac-like equations arises. It is shown that a generalized equation for Majorana particle with three mass parameters exists as well, such a generalized Majorana equation is not split into three separated equations in curved space-time if the Ricci scalar of the space-time model does not vanish.

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