

## **Exact solutions of the Dirac equation in central backgrounds of any dimensions**

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### **ABSTRACT**

It is shown that the free Dirac equation in spherically symmetric static backgrounds of any dimensions can be put in a simple form using a special version of Cartesian gauge in Cartesian coordinates. This is manifestly covariant under the transformations of the isometry group so that the generalized spherical coordinates can be separated in terms of angular spinors like in the flat case, obtaining a pair of radial equations. In this approach the equation of the free field Dirac in some central backgrounds can be analytically solved obtaining the formula of the energy levels and the corresponding eigenspinors. The example we give are the solutions of the Dirac equation with explicit mass term in  $AdS_{d+1}$  spacetimes and those formed by  $d$ -dimensional spheres with the time trivially added.

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