Time-periodic solutions of the Dirac equation
in the extreme Kerr geometry

Harald Schmid
NWFI - Mathematik
Universität Regensburg
Universitätsstrasse 31
D-93053 Regensburg
GERMANY

Abstract

We consider normalizable time-periodic solutions of the Dirac equation in the exterior region of an extreme Kerr black hole background with mass $M$ and angular momentum $J$. It is shown that for particular values of $J$ and given azimuthal quantum number $k$ the Dirac equation has a bound state solution, and that the one-particle energy of this solution is given by

$$\omega = -\frac{kM}{2J}.$$ 

Moreover, an explicit expression for the radial eigenfunctions will be presented.