COX'S PARTICLE IN MAGNETIC AND ELECTRIC FIELDS AGAINST THE BACKGROUND OF EUCLIDEAN AND SPHERICAL GEOMETRIES

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S u m m a r y

The generalized relativistic Klein–Fock–Gordon equation for Cox's non-point scalar particle with intrinsic structure is solved in the presence of external uniform magnetic and electric fields in the Minkowski space. Similar problems in the non-relativistic approximation in a closed spherical Riemann 3-space are examined. The complete separation of the variables in the system of special cylindric coordinates in a curved model is performed. In the presence of a magnetic field, the quantum problem in the radial variable is solved exactly, and the wave functions and the corresponding energy levels are found: the quantum motion in the z-direction is described by a one-dimensional Schrödinger-like equation in an effective potential, which turns out to be too difficult for the analytical treatment. In the presence of an electric field against the background of the curved model, the situation is similar: the radial equation is solved exactly in hypergeometric functions, but the equation in the z-variable can be examined only qualitatively.