QUANTUM MECHANICS OF A SPIN 1 PARTICLE IN THE MAGNETIC MONOPOLE POTENTIAL, IN SPACES OF EUCLID AND LOBACHEVSKY: NON-RELATIVISTIC APPROXIMATION

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S u m m a r y

A spin-1 particle is treated in the presence of a Dirac magnetic monopole in the non-relativistic approximation. After the separation of variables, the problem is reduced to the system of three interrelated equations, which can be disconnected with the use of a special linear transformation making the mixing matrix diagonal. As a result, there arise three separate differential equations which contain the roots of a cubic algebraic equation as parameters. The algorithm permits the extension to the case where external spherically symmetric fields are present. The cases of the Coulomb and oscillator potentials are treated in detail. The approach is generalized to the case of the Lobachevsky hyperbolic space. The exact solutions of the radial equation are constructed in terms of hypergeometric functions and Heun functions.