

On P-noninvariant Wave Equation for a Spin $\frac{1}{2}$ Particle with Anomalous Magnetic Moment Field

Kisel V. V. ¹,

Pletyukhov V. A. (Foreign) ²,

Ovsiyuk E. M. (Foreign) ³,

Red'kov V. M. (Foreign) ⁴

2019

¹ Department of Physics, Belarusian State University of Informatics and Radioelectronics, P. Browka 6, 220013 Minsk, Belarus
Belarus)

² Foreign (Brest State University named after A.S. Pushkin, Brest, Belarus)

³ Foreign (Mozyr State Pedagogical University named after I.P. Shamyakin, Mozyr, Belarus)

⁴ Foreign (Institute of Physics B. I. Stepanova of the National Academy of Sciences of Belarus, Minsk, Belarus)

Keywords: Generalized wave equation, P-noninvariant equation, anomalous magnetic moment, Coulomb field, exact solutions, Heun functions.

Abstract. Within the theory of relativistic wave equations with extended sets of Lorentz group representations, a new P-noninvariant 20-component wave equation for spin 1/2 particle is proposed. The presence of an external electromagnetic field and Riemannian space-time background are taken into account. Due to internal structure of the particle, additional interaction terms appears, it relates to anomalous magnetic moment of the particle. Exact solutions of the equation in the presence of an external Coulomb field have been constructed, radial wave functions are expressed in terms of the confluent Heun functions.

This article published in: Nonlinear Phenomena in Complex Systems, 2019, vol. 22, №1, p. 18-40.