overcoming is greater?" At relatively high temperatures, in accordance with the Arrhenius law, the probabilities of overcoming the barriers are determined by their heights, and at temperatures close to absolute zero, when the ratchet moves according to the tunnel mechanism, the barrier shapes become important. Therefore, for narrow high and low wide barriers, the overcoming mechanism may turn out to be different and, moreover, dependent on temperature. As a result, a temperature-induced change in the direction of the ratchet motion may occur. We present a simple interpolation theory to illustrate this effect. We also formulate simple criteria for the choice of the shape of the potential relief at which one can experimentally observe motion reversal.

[1] V. M. Rozenbaum, I. V. Shapochkina, L. I. Trakhtenberg. Tunneling mechanism for changing the motion direction of a pulsating ratchet. Temperature effect. JETP Letters **118**, 369 (2023).

Spin 1 Particle with Anomalous Magnetic Moment and Polarizability in presence of the uniform magnetic field

E.M. Ovsiyuk, P.O. Sachenok, A.V. Ivashkevich, A.V. Bury
(Mozyr State University, Belarus)

Within the general method by Gel'fand – Yaglom, starting with the extended set of representations of the Lorentz group, we have constructed a relativistic generalized system of the first order equations for a spin 1 particle with two additional characteristics, anomalous magnetic moment and polarizability. In tensor form, we have taken into account the presence of external electromagnetic fields. After eliminating the accessory variables of the complete wave function, we derive the minimal 10-component form of equations, the last includes two additional interaction terms which are interpreted as related to anomalous magnetic and moment and polarizability. This approach is extended to space-time models with pseudo-Riemannian structure, within the tetrad method. We specify the basic equation to the cylindrical coordinates and tetrad, and in presence of the external uniform magnetic field. After separating the variables, we derive the system of 10 first order differential equations in polar coordinate. To resolve this system, we apply the method by Fedorov – Gronskiy. Within this approach, the complete 10-component wave function is decomposed in three projective constituents, dependence of each on the polar coordinates is determined by only one function. We find expressions for this basic function $F_i(r)$ in terms of confluent hypergeometric equations; at this there arises a quantization rule for some spectral parameter. Within the method by Fedorov – Gronskiy, additionally arises algebraic homogenous system of 10 equations, which completely determines the structure of 10-component solutions. From vanishing the determinant of the algebraic system, we derive a cubic algebraic equation with respect to energy parameter ϵ^2. Its solutions are found in analytical form, and studied numerically.

Hardronic Decays of Heavy Lepton

S. Avakyan, E. Avakyan
Sukhoi State Technical University of Gomel, Gomel, Belarus

Two-particle decays of the τ -lepton: $\tau \to \pi\nu_\tau, \tau \to K\nu_\tau, \tau \to \rho\nu_\tau, \tau \to K^\star\nu_\tau, \tau \to a_1(1250)\nu_\tau$ have been studied in the framework of the Quark Confined Model . The obtained branching values are in good agreement with the experimental data. The three-particle decay $\tau \to \pi\pi\nu_\tau$ has been studied. The contribution of the direct diagram and the diagram with the intermediate $\rho(770)$ meson have been considered separately. The obtained numerical value $Br(\tau \to \pi\pi\nu_\tau = 0,237$ is in good agreement with the existing experimental situation.

Leptonic and Semileptonic Interactions of Charmed Mesons

E. Avakyan, S. Avakyan
(Sukhoi State Technical University of Gomel, Gomel, Belarus)

Within the framework of the Covariant Model of Constituent Quarks (CMCQ), leptonic and semileptonic decays of D mesons have been studied. The widths of leptonic decays