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ELECTROMAGNETIC FORM FACTORS, TCHEBICHEF POLYNOMIALS AND GENERALIZED ROSENBLUTH FORMULA

Elastic scattering of the ultra relativistic polarized electrons on atomic nucleus with arbitrary spin is considered. The covariant parameterization of the electromagnetic current for a particle with arbitrary spin is used. This parameterization is based on the Bargman - Wigner formalism for the description of arbitrary spin particles (atomic nuclei) with using Tchebichef polynomials of a discrete variable for determination of the "physical" electromagnetic form factors that are electric and magnetic multipole momenta in the Breit reference frame. The generalized Rosenbluth formula is obtained for the cross section of the ultra relativistic electron scattering in a laboratory system in terms of the "physical" electromagnetic form factors as well as the initial and final polarization characteristics of the electron.

Keywords: elastic scattering, relativistic energy, polarized electrons, electromagnetic form factors, Bargman - Wigner formalism, Tchebichef polynomials, Rosenbluth formula.