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Theory of Antisymmetric Tensor Fields

Valeri DVOEGLAZOV
Universidad de Zacatecas,
Apartado Postal 636, Suc. UAZ, Zacatecas 98062, Zac., M'exico
e-mail: valeri@ahobon.reduaz.mx
URL: http://ahobon.reduaz.mx/~~valeri/valeri.htm

Abstract: It has long been claimed that the antisymmetric tensor field of the second rank is pure longitudinal after quantization. In my opinion, such a situation is quite unacceptable. I repeat the well-known procedure of the derivation of the set of Proca equations. It is shown that it can be written in various forms. Furthermore, on the basis of the Lagrangian formalism I calculate dynamical invariants (including the Pauli-Lubanski vector of relativistic spin for this field). Even on the classical level, the Pauli-Lubanski vector can be equal to zero after applications of well-known constraints. The importance of the normalization is pointed out for the problem of the description of quantized fields of maximal spin 1. The correct quantization procedure permits us to propose a solution to this puzzle in modern field theory. Finally, the discussion of the connection of the Ogievetski\u{\i}-Polubarinov-Kalb-Ramond field and the electrodynamic gauge is presented. PACS: 03.50.-z, 03.50.De, 03.65.Pm, 11.10.-z, 11.10.Ef

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