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Relativistic corrections to the algebra of position variables and spin-orbital interaction.

(English) [Zbl 1368.81103](#)

Phys. Lett., B 761, 207-212 (2016).

Summary: In the framework of vector model of spin, we discuss the problem of a covariant formalism [*A. A. Pomeranskiĭ* and *I. B. Khriplovich*, “Equations of motion of a spinning relativistic particle in external fields”, *J. Exp. Theor. Phys.* 86, No. 5, 839–849 (1998; doi:10.1134/1.558554)] concerning the discrepancy between relativistic and Pauli Hamiltonians. We show how the spin-induced non-commutativity of a position accounts for the discrepancy on the classical level, without appeal to the Dirac equation and Foldy-Wouthuysen transformation.

MSC:

81R15 Operator algebra methods applied to problems in quantum theory

70H45 Constrained dynamics, Dirac’s theory of constraints

Cited in **5** Documents

Keywords:

vector model of relativistic spin; first relativistic corrections; problem of covariant formalism; hydrogen atom spectrum; theories with constraints; non commutative position

Full Text: [DOI](#) [arXiv](#)

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