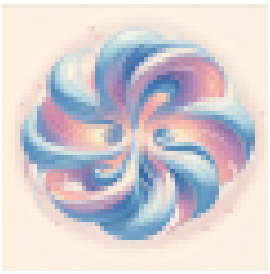

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Pryce's spin and polarization of massive Dirac fermions

lundi 22 juillet 2024 12:00 (30 minutes)

A major difficulty in QFT comes from the fact that the traditional Pauli-Dirac spin operator of Dirac's theory is not a conserved observable. This inconvenience can be overdrawn taking the Pauli-Lubanski operator as covariant spin operator, even though this is not related directly to an $SU(2)$ symmetry. Another possibility is to focus on the new spin and position operators proposed initially by Pryce long time ago and re-defined recently with the help of a new spin symmetry and suitable spectral representations. [I. I. Cot\u aescu, Eur. Phys. J. C (2022) 82:1073]. In this framework the quantization gives rise to a large set of one-particle operators with physical meaning, including the spin and orbital parts of isometry generators. A special attention is paid to the new spin and polarization one-particle operators which are compared with other operators describing polarization used so far.

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