



# Spinors in Physics

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 Invented by Dirac in creating his relativistic quantum theory of the electron, spinors are important in quantum theory, relativity, nuclear physics, atomic and molecular physics, and condensed matter physics. Essentially, they are the mathematical entities that correspond to electrons in the same way that ordinary wave functions correspond to classical particles. Because of their relations to the rotation group  $SO(n)$  and the unitary group  $SU(n)$ , this discussion will be of interest to applied mathematicians as well as physicists. | &apasl Spinors in Three-Dimensional Space.- 1 Two-Component Spinor Geometry.- 1.1 Definition of a Spinor.- 1.1.1 Stereographic Projection.- 1.1.2 Vectors Associated with a Spinor.- 1.1.3 The Definition of a Spinor.- 1.2 Geometrical Properties.- 1.2.1 Plane Symmetries.- 1.2.2 Rotations.- 1.2.3 The Olinde-Rodrigues Parameters.- 1.2.4 Rotations Defined in Terms of the Euler Angles.- 1.3 Infinitesimal Properties of Rotations.- 1.3.1 The Infinitesimal Rotation Matrix.- 1.3.2 The Pauli Matrices.- 1.3.3 Properties of the Pauli Matrices.- 1.4 Algebraic Properties of Spinors.- 1.4.1 Operations on Spinors.- 1.4.2 Properties of Operations on Spinors.- 1.4.3 The Basis of the Vector Space of Spinors.- 1.4.4 Hermitian Vector Spaces.- 1.4.5 Properties of the Hermitian Product.- 1.4.6 The Use of an Antisymmetric Metric Tensor.- 1.5 Solved...



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