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Covariance And Spectral Geometry of Spinor Fields

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All the fundamental matter particles are fermions and correspond
to spinor fields.
They arise as projective representation of the rotations
and (pseudo) orthogonal groups, and their installation on curved
space-times requires introducing of particular geometric structures.
I will discuss some of their surprising and nontrivial aspects
including the seldom discussed subtle issue of general covariance.
Another aspect of spinor fields I will survey
is the spectral geometry as described by the Dirac operator
which constitutes a crucial ingredient of a {\em spectral triple};
the appropriate concept for a passage to “quantum” spaces.

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