The Standard Model in Noncommutative Geometry and Morita equivalence

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After a brief review of the spectral action approach to the Standard Model of particle physics, I will discuss some properties of the finite-dimensional spectral triple describing the internal degrees of freedom of elementary particles. On a Riemannian spin manifold M, an algebraic characterization of the module of Dirac spinors (sections of the spinor bundle) is as the Morita equivalence bimodule between the algebra of continuous functions on M and the Clifford algebra bundle. In the case of Hodge-Dirac operator on a oriented Riemannian manifold, on the other hand, the module of Hodge spinors can be characterized as self Morita equivalence bimodule for the Clifford algebra bundle. Both conditions admit a natural generalization to non-commutative manifolds and impose some constraints on the form of the Dirac operator. I will report on a recent work with L. Dabrowski and A. Sitarz, where we investigate such constraints for the spectral triple of the Standard Model of elementary particles.