

General Mathematics Seminar
Of the
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Campus Kirchberg, room A02

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Gauge theories and noncommutative manifolds

Abstract:

In this talk, we will discuss some aspects of the intrinsic gauge theoretical nature of noncommutative manifolds. Following Connes, we describe a noncommutative (Riemannian, spin) manifold by its fundamental class in K -homology. Among other functional analytical data, such a K -cycle consists of a (noncommutative) C^* -algebra. As a consequence of noncommutativity, there might exist non-trivial inner automorphisms; these will be referred to as gauge transformations.

The key example that motivates this terminology from physics is when one replaces the algebra of functions on a manifold by matrix-valued functions. The resulting Morita equivalence describes ordinary Yang-Mills theory as formulated in terms of vector bundles and connections thereon. If time permits, we will consider a second class of examples, so-called toric noncommutative manifolds.

