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CW structures in noncommutative geometry

I will illustrate some examples and ideas for a theory of CW complexes in non-commutative geometry. In order to accommodate some important examples, instead of diagrams in the category of quantum spaces (dual to C^* -algebras) one is forced to work with a suitable homotopy category. In this category, K-theory computations are made possible through the use of a Mayer-Vietoris sequence. The K-theory of a quantum space can be promoted from a plain abelian group to an augmented ring (in the sense of Cartan-Eilenberg), giving a finer topological invariant. The construction of this invariant suggests a notion of "topology" and "continuity" in the quantum setting (a kind of Grothendieck topology). This is a work in progress in collaboration with P. M. Hajac, T. Maszczyk, A. Sheu, B. Zieliński.