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Kempner Colloquium

Noncommutative line bundles associated to multipullback quantum odd spheres

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In terms of multipullback C*-algebras, we construct a noncommutative deformation of odd-dimensional spheres that preserves the natural partition of the (2n+1)-dimensional sphere into (n+1)-many solid tori. The aim of this talk is to explain in an elementary way basic ideas proving that the noncommutative line bundles associated to the multipullback quantum (2n+1)-dimensional sphere are pairwise stably non-isomorphic. In particular, we conclude that the tautological line bundles over the multipullback quantum complex projective spaces are not stably trivial. First, we use the technology of higher-rank graph C*-algebras to prove that our multipullback C*-algebras are universal for commuting isometries satisfying a sphere equation. Furthermore, by finding a strong connection, we show that the natural U(1)-action on our quantum (2n+1)-dimensional sphere is free. This puts us in the framework of Chern-Galois theory which, combined with the aforementioned universal presentation, reduces the pairwise non-isomorphism problem from dimension 2n+1 to dimension 3. The latter case is handled by an index pairing computation thus completing the proof. By very ample references to the standard geometry of odd-dimensional spheres thought of as U(1)-principal bundles over complex projective spaces, the talk will be accessible to non-experts. (Based on joint work with David Pask, Aidan Sims and Bartosz Zielinski.)

Tuesday September 22, 2015
12:10 PM - 12:50 PM
MATH 350