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*Transversals and Connes' duality for the irrational rotation algebra*

In this talk we explain how transversals to Kronecker foliations of the 2-torus can be used to invert Connes' Poincaré duality map for the irrational rotation algebra. Connes' map, which uses a well-known spectral triple similar to the Dolbeault cycle for the ordinary 2-torus, gave the first example of a noncommutative  $C^*$ -algebra exhibiting Poincaré duality in K-theory, but the result was (arguably) not quite complete until now as no cycle has ever been described representing the Poincaré dual of Connes' spectral triple. We rectify this with our constructions with transversals and re-prove duality for the irrational rotation algebra by verifying the zig-zag equations for Connes' class, and ours.