

KK-THEORY AND COHOMOLOGY OF ARITHMETIC GROUPS

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24 October, 14:00-15:30

Cohomology of arithmetic groups and its structure as a Hecke module plays a prominent role in modern number theory. Classically, the cohomology of an arithmetic group Γ can be studied geometrically through its action on the associated global symmetric space X . In low dimensions, such actions produce non-compact hyperbolic manifolds as quotient spaces, as well as dynamically complicated actions on the boundary of X . In joint work with M. H. Sengun, we show that the cohomology of Γ , as a Hecke module, can be captured by the K-groups of certain noncommutative C^* -algebras which encode the action of Γ both on X and on its boundary. The Hecke operators can be rigidly defined as explicit classes in KK-theory acting on relevant K-groups in a way compatible with Morita equivalence and boundary maps. This provides a uniform framework to study the K-homology of arithmetic groups.