

Analysis on locally symmetric spaces

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Symmetric spaces are generalizations of the classical two-dimensional geometries (Euclidean, Spherical, Non-Euclidean) to higher dimensions. Locally symmetric spaces are quotients of symmetric spaces by discrete groups of isometries acting on the symmetric spaces. Considering fundamental domains of these actions they can be viewed as tiles in a tiling with suitable pieces of the boundary identified with each other - visualize Escher type tilings of a disk.

Locally symmetric spaces occur naturally in number theory, but they are also model cases for differential geometry, ergodic theory and mathematical physics. This is so because in many contexts the large degree of symmetry allows to use group theoretic methods to obtain more specific results than for generic Riemannian manifolds.

The focus of this talk will be on the interplay between the spectral theory of invariant differential operators and the geometry of locally symmetric spaces. The methods employed come from non-commutative harmonic analysis, microlocal analysis and dynamical systems.