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Finite groups and hyperbolic manifolds

The isometry group of a closed hyperbolic n-manifold is finite. In 1974, Leon Greenberg proved the converse for $n = 2$, i.e., every finite group is the full isometry group of some closed hyperbolic surface. Kojima (1988) extended the result to $n = 3$. We will show the general case:

For every $n > 1$ and every finite group G there is an n-dimensional closed hyperbolic manifold whose isometry group is isomorhic to G.

An interesting aspect of the proof is that it is nonconstructive; it uses a "probabilistic method", i.e. counting results from the theory of "subgroup growth".

(Based on a joint work with M. Belilopesky, Invent. Math. 2006.)