Boğaziçi
MATH COLLOQUIUM

Asymptotics of torsion homology of hyperbolic 3-manifolds

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Abstract: Hyperbolic 3-manifolds have been studied intensely by topologists since the mid-1970's. When the fundamental group arises from a certain number theoretic construction (in this case, the manifold is called "arithmetic"), the manifold acquires extra features that lead to important connections with number theory. Accordingly, arithmetic hyperbolic 3-manifolds have been studied by number theorists (perhaps not as intensely as the topologists) with different motivations.

Very recently, number theorists have started to study the torsion in the homology of arithmetic hyperbolic 3-manifolds. The aim of the first half of this introductory talk, where we will touch upon notions like "arithmeticity", "Hecke operators", will be to illustrate the importance of torsion from the perspective of number theory. In the second half, I will present new joint work with N.Bergeron and A.Venkatesh which relates the topological complexity of homology cycles to the asymptotic growth of torsion in the homology. I will especially focus on the interesting use of the celebrated "Cheeger-Mueller Theorem" from global analysis.

Date : Wednesday, December 24, 2014
Time: 2pm
Place: TB 250, Boğaziçi University