

# Seminarium geometrów

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## Drilling hyperbolic groups

Abstract: Drilling a closed hyperbolic 3-manifold along an embedded geodesic is an important tool in low-dimensional topology. It transforms the fundamental group of the manifold into a relatively hyperbolic group. We prove that, under suitable conditions, a similar “drilling” operation can be performed on a (Gromov) hyperbolic group with 2-sphere boundary.

Our main motivations and applications concern the Cannon Conjecture. The Cannon Conjecture asserts that if the Gromov boundary of a (Gromov) hyperbolic group is homeomorphic to the two-sphere then the group is virtually (i.e. up to a finite index subgroup) the fundamental group of a closed 3-manifold of constant curvature  $-1$ . There is a relatively hyperbolic version – the Toral Relative Cannon Conjecture.

Using drilling we show that if the Toral Relative Cannon Conjecture holds then the Cannon Conjecture holds for all residually finite hyperbolic groups. The former conjecture seems to be more tractable due to an existence of additional structure – of abelian parabolic subgroups.

This is joint work with Daniel Groves, Peter Haïssinsky, Jason Manning, Alessandro Sisto, and Genevieve Walsh.

*streaming via ZOOM:*

Meeting ID: 967 6507 7409

Meeting password: “GS” (two letters) followed by the Euler characteristic of the closed orientable surface of genus 89.