1113-70-264 **Nandor J Simanyi*** (simanyi@uab.edu), UAB Department of Mathematics, Campbell Hall, 1300 University Boulevard, Birmingham, AL 35294-1170, and **Caleb C Moxley** (ccmoxley@uab.edu), UAB Department of Mathematics, Campbell Hall, 1300 University Boulevard, Birmingham, AL 35294-1170. *Homotopical Complexity of Certain 3D Cylindric Billiards.* Preliminary report.

This is a preliminary report on some new results concerning the homotopical complexity of the orbits of certain $3D$ cylindric billiard flows. There are two models under investigation: The billiard flow in the flat 3-torus T^3 minus two orthogonal, intersecting cylindric scatteres on the one hand, and the billiard flow in the flat 3-torus T^3 minus two orthogonal, disjoint cylindric scatteres on the other hand. The homotopical complexity of long orbit segments is measured in the Cayley graphs of the fundamental groups of these billiard tables, which groups by themselves are pretty intriguing hyperbolic groups. We give lower and upper bounds for the radial sizes of the arising homotopical rotation sets. The primary tool for the construction of long orbit segments following a prescribed homotopical itinerary is the length minimizing variational method. We make this method work by introducing the proper notion of the so called admissible orbit segments for both models.

This is an ongoing joint research project with my PhD student, Caleb C. Moxley. (Received August 24, 2015)