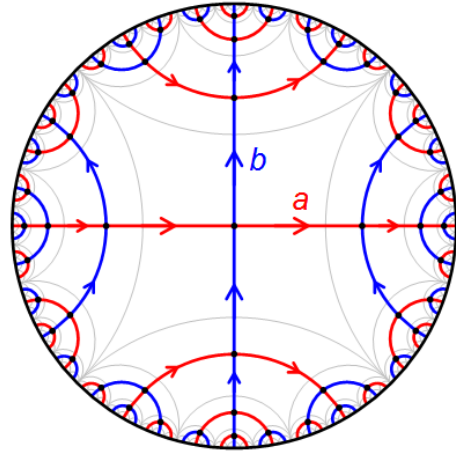


Oberseminar Geometrie
Department of Mathematics
University of Fribourg
Seminar room, Math II (Lonza)
Wednesday May 3, 2017, 10:20-12:00



MATTHEW TOINTON (Neuchâtel)

Approximate groups and applications to the growth of groups

Given a set A in a group, write A^n for the set of all products $x_1 \dots x_n$ with each x_i belonging to A . Roughly speaking, a set A for which A^2 is "not much larger than" A is called an "approximate group". The "growth" of A , on the other hand, refers to the behaviour of $|A^n|$ as n tends to infinity. Both of these have been fruitful areas of study, with applications in various branches of mathematics, not least geometry.

Remarkably, understanding the behaviour of approximate groups allows us to convert information about A^k for some single fixed k into information about the sequence A^n as n tends to infinity, and in particular about the growth of A .

In this talk I will present various results describing the algebraic structure of approximate groups, and then explain how to use these to prove new results about growth. In particular, I will describe work with Romain Tessera in which we show that if $|A^k|$ is bounded by Mk^D for some given M and D then, provided k is large enough, $|A^n|$ is bounded by $M'n^D$ for every $n > k$, with M' depending only on M and D . This verifies a conjecture of Itai Benjamini.