Universität Münster

Fachbereich 10
Mathematik und Informatik
Prof. Dr. Arthur Bartels
Dekan

04.11.2026

E i n l a d u n g

zum

Habilitationskolloquium von Dr. Samuel Evington

am

Mittwoch, 11.11.2026, 10:00 s. t. Uhr, M 4

Thema des Vortrages:
On sofic and non-sofic groups

A group G is called sofic if for every finite subset $K \subseteq G$ and every $\varepsilon > 0$ there exists a (K, ε)-almost-homomorphism $\phi : G \to S_n$ for some $n \in \mathbb{N}$. Here, S_n is the symmetric group on n letters and, loosely speaking, "(K, ε)-almost" means that the map ϕ is approximately injective and multiplicative on K up to an ε-small error in the normalized Hamming metric on S_n.

The class of sofic groups was first studied by Gromov (using an equivalent definition) while working on cellular automata ([2]). The reformulation of Gromov's notion into the form alluded to above is due to Elek and Szabo ([1]). The sofic condition can be viewed as saying that G can be (externally) approximated by finite groups in a fairly weak sense. In particular, all amenable groups are sofic and so are all residually finite groups (such as free groups).

Until very recently, there were no known examples of groups that were provably non-sofic. However, there has been substantial work on potential strategies for constructing such groups, especially in light of the 2020 preprint MIP* = RE ([3]), which implies a negative solution to the closely related Connes embedding problem.

In August 2026, OpenAI released an AI-generated proof of the existence of a non-sofic group ([6]), building on the techniques developed by Kun ([4]) and Kun–Thom ([5]). In this talk, I will begin with a brief survey of soficity before discussing the construction of a non-sofic group and how exactly non-soficity is established.

References

[1] Elek, G., and Szabó, E. Sofic groups and direct finiteness. *J. Algebra 280*, 2 (2004), 426–434.
[2] Gromov, M. Endomorphisms of symbolic algebraic varieties. *J. Eur. Math. Soc. (JEMS) 1*, 2 (1999), 109–197.
[3] Ji, Z., Natarajan, A., Vidick, T., Wright, J., and Yuen, H. Mip*=re, 2026. https://arxiv.org/abs/2001.04383, to appear in Ann. of Math. (2).
[4] Kun, G. On sofic approximations of property (t) groups, 2019. https://arxiv.org/abs/1606.04471.
[5] Kun, G., and Thom, A. Inapproximability of actions and kazhdan's property (t), 2026. https://arxiv.org/abs/1901.03963.
[6] OpenAI. Ten Advances in Mathematics and Theoretical Computer Science. Open AI Math Release preprint, 2026. https://cdn.openai.com/pdf/ten-proofs-oai.pdf.

Zum Vortrag sowie zur Urkundenübergabe (im Anschluss an den FBR im Foyer des Hochhauses) sind alle Mitglieder des Fachbereichs herzlich eingeladen.

gez. Arthur Bartels, Dekan

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