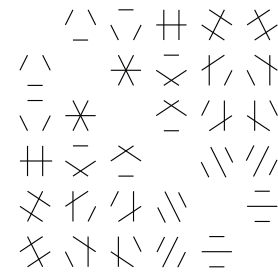


# Mathematics Seminar



## Rocky Mountain Algebraic Combinatorics Seminar

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### Expander graphs arising from finite groups

Martin Kassabov  
Cornell University

Informally, expander graphs are graphs which can not be easily disconnected. In the case of bounded degree, this property is equivalent to a spectral gap in the Laplacian matrix of the graph. Margulis was the first to find an explicit construction of expander graphs, relating expansion to Kazhdan's property  $T$ . I will outline this connection and construct several families of expander graphs.

### Groups with property $T$ and infinitely many alternating quotients

Martin Kassabov  
Cornell University

I will outline several methods for showing property  $T$  – one of the methods which originated in the work of Dymara and Januszkiewicz uses the geometry of Hilbert spaces. I will use an extension of the method to show that certain subgroups of  $\text{Aut}(\mathbb{F}_p[x, y, z])$  have property  $T$ . As a consequence for any prime  $p$ , we construct 3 permutations in  $\text{Alt}(p^3 - 1)$  which not only generate the group but also make the resulting Cayley graphs expanders.

This is joint work with Pierre-Emmanuel Caprace.

Weber 223  
4–6 pm, Friday, Nov 4, 2022  
(Refreshments 3:30–4 pm)  
Colorado State University  
4 pm, Friday, Nov 4, 2022

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This is a joint Denver U / UC Boulder / U of Wyoming / CSU seminar that meets biweekly.  
Anyone interested is welcome to join us at a local restaurant for dinner after the talks.



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