

## **abstract**

LIE GROUPS, REPRESENTATIONS AND DISCRETE MATH

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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Paley graphs are well-known combinatorial objects which have many interesting properties. Many of these properties come from their symmetry under the automorphisms  $x \mapsto ax+b$  of the affine line over a finite field  $F$  with  $q$  elements ( $q=4m+1$ ).

We construct new simplicial complexes attached to certain groups, concentrating on  $G=\mathrm{PGL}(2,F_q)$  for any finite field  $F$ . For every divisor  $d$  of  $q-1$  we construct a "small" 2-dimensional complex with  $G$ -action. In a special case, the star of each vertex is a Paley graph. When  $d$  decreases from  $q$  to 1 the fundamental groups of the complexes give free, surface, property T, building, and finally simply connected complexes (this uses the Weil bounds for the number of points on curves over a finite field)