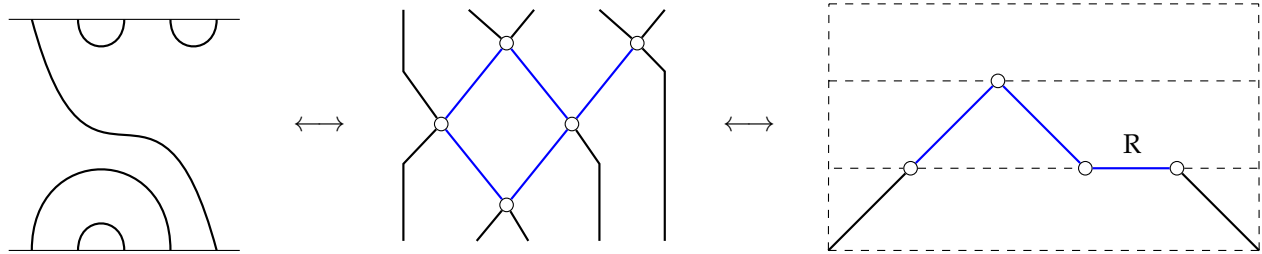


# COLLOQUIUM

MATHEMATICS AND STATISTICS

QUEEN'S UNIVERSITY



## FULLY COMMUTATIVE ELEMENTS OF COXETER GROUPS AND THEIR HEAPS

**Abstract.** An element in a Coxeter group is called *fully commutative* if any of its reduced words can be obtained from any other by braid relations that only involve commuting generators. Fully commutative elements can often be studied in terms of their *heaps*, and are closely connected to the study of symmetric functions, Catalan combinatorics, generalized Temperley-Lieb algebras, and Kazhdan-Lusztig theory. In particular, the fully commutative elements in a symmetric group are exactly the 321-avoiding permutations, and they index a basis of the usual Temperley-Lieb algebra of type  $A$ .

In this talk, we will recall the classification of all Coxeter groups with finitely many fully commutative elements and highlight an interesting connection between heaps of fully commutative elements and Lusztig's  $\mathbf{a}$ -function on a Coxeter group. Using this connection, we will then classify all Coxeter groups with finitely many elements of  $\mathbf{a}$ -value 2. (This is a joint result with Richard Green.)

### Tianyuan Xu (Queen's University)

Tianyuan Xu earned his Ph.D. in Mathematics from the University of Oregon in 2017 under the supervision of Victor Ostrik. He recently joined Queen's University as a Coleman Postdoctoral Fellow. Dr. Xu's research interests are in algebraic combinatorics and representation theory. More specifically, he focuses on Coxeter groups, Hecke algebras, asymptotic Hecke algebras, and various diagram algebras.

234 JEFFERY HALL  
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