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**Tianyuan Xu\*** ([tixu6187@colorado.edu](mailto:tixu6187@colorado.edu)), Department of Mathematics, University of Colorado Boulder, Campus Box 395, Boulder, CO 80309, and **Richard M. Green** ([rmg@colorado.edu](mailto:rmg@colorado.edu)), Department of Mathematics, University of Colorado Boulder, Campus Box 395, Boulder, CO 80309. *On elements of  $\mathbf{a}$ -value 2 in Coxeter groups.*

The  $\mathbf{a}$ -function on a Coxeter group  $W$  is a function  $\mathbf{a} : W \rightarrow \mathbb{N}$  defined by Lusztig which has important connections with the cell representation theory of  $W$  and its Hecke algebra. It is known that the identity element of  $W$  is the only element with  $\mathbf{a}$ -value 0, while a non-identity element has  $\mathbf{a}$ -value 1 if and only if it has a unique reduced word. However, as the definition of the  $\mathbf{a}$ -function involves products of the Kazhdan–Lusztig basis element in the Hecke algebra,  $\mathbf{a}$ -values of elements are often difficult to compute in general.

In this talk, we present some recent progress on elements of  $\mathbf{a}$ -value 2. We show that elements of  $\mathbf{a}$ -value 2 must be fully commutative in the sense of Stembridge, which allows us to associate certain posets called *heaps* to such elements. Using heaps, we conjecture a combinatorial characterization of elements of  $\mathbf{a}$ -value 2, classify Coxeter groups with finitely many elements of  $\mathbf{a}$ -value 2, and enumerate such elements in all groups from the classification. (Joint work with Richard Green.) (Received September 15, 2019)