

December 4: Minh Tam-Trinh (University of Chicago), *Algebraic braids and global Springer theory*

Let G be a reductive group with Weyl group W . Via the global Springer theory of Z. Yun, the cohomology of a parabolic Hitchin fiber with structure group G is endowed with a W -action, preserving its perverse filtration. We present a new conjecture, describing how this W -action is controlled by a family of conjugacy classes in the Artin braid group of W . To this end, we use Springer theory to construct a new class function on the Artin braid group, which in type A refines the Markov trace used to construct the HOMFLY link invariant. In fact, our conjectured identity recovers a theorem of Maulik, relating compactified Jacobians of plane curves with HOMFLY polynomials. Beyond type A , we prove our identity in certain cases by expressing both sides in terms of representations of rational Cherednik algebras. If time permits, we will explain how the conjecture would give evidence for $P = W$ phenomena in the sense of nonabelian Hodge theory, and how a categorified variant recovers a conjecture of Oblomkov-Rasmussen-Shende.