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**Heather Russell** and **Julianna Tymoczko\*** (tymoczko@math.uiowa.edu), Department of Mathematics, MacLean Hall, University of Iowa, Iowa City, IA 52242. *Tangle invariants and Springer representations.*

While exploring his celebrated homology theory for tangles, Khovanov developed a family of rings that are invariants of tangle cobordisms. He made a remarkable discovery: the center of each ring is isomorphic to the cohomology of a Springer variety. Springer varieties are important objects in geometric representation theory; amazingly, their cohomology carries a natural action of the symmetric group, and the top dimensional cohomology is an irreducible representation. Unfortunately, traditional geometric and topological constructions of the Springer representations use powerful technical tools that make explicit calculations near impossible.

We use Khovanov's results to give a concrete geometric presentation of some Springer representations as well as an explicit combinatorial presentation in terms of certain braid actions on noncrossing matchings. As an application, we explicitly compute Springer representations outside of the top-degree case. We obtain the new result that for the so-called two-row Springer fibers, each graded part of the cohomology is an irreducible representation. (Received August 01, 2008)