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*A crystal basis for two-row Kronecker coefficients*

The Kronecker coefficient  $g_{\lambda\mu\nu}$  is the multiplicity of the  $GL(V) \times GL(W)$ -irreducible  $V_\lambda \otimes W_\mu$  in the restriction of the  $GL(X)$ -irreducible  $X_\nu$  via the natural map  $GL(V) \times GL(W) \rightarrow GL(X)$ , where  $X = V \otimes W$ . A difficult open problem in algebraic combinatorics is to find a positive combinatorial formula for these coefficients. We outline an approach to this problem using crystal bases, describe its successful implementation in the  $\dim V = \dim W = 2$  case, and discuss difficulties encountered in harder cases. This is joint work with Ketan Mulmuley and Milind Sohoni.