McKay Matrices and Quivers

Georgia Benkart
University of Wisconsin-Madison

The McKay correspondence is a bijection between the finite subgroups G of SU_2 and the simply-laced affine Dynkin diagrams. McKay's insight was that the quivers determined by tensoring the simple modules of G with the G-module $V = \mathbb{C}^2$ exactly correspond to the affine Dynkin diagrams of type A, D, E.

This talk will focus on the McKay correspondence from the point of view of Schur-Weyl duality for any finite group G (or finite-dimensional Hopf algebra) and any finite-dimensional G-module V. This provides results on the tensor product module $V^{\otimes k}$ and its G-invariants, and on the centralizer algebra $\mathsf{End}_G(V^{\otimes k})$, which often has a nice diagrammatic realization. It leads (Leeds) to the investigations that our WINART2 group has begun. There are applications to subfactors of operator algebras, knot and link invariants, and the Potts model in statistical mechanics, and more recently to chip-firing dynamics and Markov chains.