

Invariants of 4-manifolds from Khovanov-Rozansky link homology

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Ribbon categories are 3-dimensional algebraic structures that control quantum link polynomials and that give rise to 3-manifold invariants known as skein modules. I will describe how to use the $\mathfrak{gl}(N)$ Khovanov-Rozansky link homology to obtain a 4-dimensional algebraic structure that gives rise to vector space-valued invariants of smooth 4-manifolds. The technical heart of this construction is the newly established functoriality of Khovanov-Rozansky homology in the 3-sphere. Based on joint work with Scott Morrison and Kevin Walker