

Insights from the quantum modularity of 3-manifold invariants

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A recently proposed class of topological 3-manifold invariants $Z^r[M]$ which admit series expansions with integer coefficients has been a focal point of much research over the past few years, proving themselves ubiquitous in a wide range of contexts. They were originally defined physically as an index which computes the BPS spectra of certain supersymmetric quantum field theories in three dimensions, and associated to 3-manifolds M through the 3d-3d correspondence. Mathematically, they have also been shown to possess curious number-theoretic features, giving examples of quantum modular forms. After reviewing some of these new developments, here I explore certain higher rank extensions and highlight emerging features of the corresponding Z^r invariants, such as nested relations with respect to their rank and a hidden modular structure.

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