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Units, K-theory, and quantum invariants of knots

Don Zagier

Max Planck Institute for Mathematics, Germany

In recent years, there has been intense interest in the quantum invariants of knots and their asymptotic properties, a typical example being the celebrated Volume Conjecture for the Kashaev invariant. But it turns out there are also very interesting arithmetic properties of these invariants, including a surprising near-modular transformation property. Even though many of these are only conjectural, one can check them numerically to high precision, and when one does this, algebraic numbers of a special sort (roots of units in certain number fields) appear by magic. This led, in joint work with Frank Calegari and Stavros Garoufalidis, to a new (non-conjectural) construction of units starting from elements in so-called Bloch groups, and as a side product also to a solution of Nahm's conjecture on the modularity of certain special q-hypergeometric series.