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Correspondences, K-theory, and loop groups

Ideas from quantum field theory and string theory continue to influence many fields of mathematics. We consider the Verlinde ring, which originally arose in two dimensional conformal field theory. Let G be a compact Lie group and LG the free loop space of G, viewed as a group by pointwise multiplication. There is a special class of unitary representations of LG in terms of which the Verlinde ring is mathematically defined. In joint work with Michael Hopkins and Constantin Teleman we locate this ring in topology, specifically a twisted version of K-theory. Furthermore, we construct the ring structure—and a Frobenius ring structure—in terms of correspondence diagrams. The talk will include some expository material on correspondences and quantum field theory.