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Kauffman algebras and geometry of the character variety of a surface in $\mathrm{SU}(2)$

In this talk, we will present some relations between the Kauffman algebra of a surface (that is a formal product on a space of curves on a surface depending on a parameter) and the character variety of the surface in $\mathrm{SU}(2)$. These relations are not completely understood and comprise a well-known isomorphism between the Kauffman algebra with parameter -1 and the algebra of regular functions on the chararacter variety. But the Kaufmann algebra at roots of unity is also a key ingredient for the construction of topological field theories. We will give another relation at parameter $-i$ which makes use of the symplectic structure and the Chern–Simons line bundle over the character variety.