

# Quantum Moduli Spaces of Flat Connections and Applications

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## Abstract content

Non-perturbative aspects of  $N=2$  SUSY gauge theories of class S are encoded in the algebra of functions on the moduli space  $M$ -flat of flat  $SL(N)$ -connections on Riemann surfaces. Expectation values of Wilson and 't Hooft line operators are related to holonomies of flat connections and, in the low-energy effective theory, to Fock-Goncharov coordinates on  $M$ -flat. We determine the non-commutative algebra of UV line operators from the quantization of Fock-Goncharov Laurent polynomials and find that it coincides with the skein algebra studied in the context of Chern-Simons theory. Another realization of the skein algebra is generated by Verlinde network operators in Toda field theory. These results provide evidence for the generalization of the AGT correspondence to higher-rank class S theories.

## Summary

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