

# FLAT CONNECTIONS, BRAID GROUPS AND QUANTUM GROUPS

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In this talk, I will describe how quantum groups serve as a useful means of expressing the monodromy of certain integrable, first order PDE's. A fundamental, and paradigmatic result in this context is the Kohno–Drinfeld theorem. Roughly speaking, it asserts that the representations of Artin's braid groups on  $n$  strands given by the universal  $R$ -matrix of a quantum group describe the monodromy of the Knizhnik–Zamolodchikov (KZ) equations, a flat connection on the configuration space on  $n$  points in  $\mathbb{C}$ .

I will describe an analogue of the Kohno–Drinfeld theorem which was conjectured in [2, 3] (and independently by De Concini) and recently proved in [4]. In this analogue, the  $R$ -matrix representations are replaced by the quantum Weyl group representations constructed by Lusztig, Kirillov–Reshetikhin and Soibelman. Accordingly, the KZ equations are replaced by the flat connection on generalised configuration spaces associated with root systems constructed in [1].

## REFERENCES

- [1] J. J. Millson, V. Toledano Laredo, *Casimir operators and monodromy representations of generalised braid groups*, Transform. Groups **10** (2005), 217–254.
- [2] V. Toledano Laredo, *A Kohno–Drinfeld theorem for quantum Weyl groups*, Duke Math. J. **112** (2002), 421–451.
- [3] V. Toledano Laredo, *Flat connections and quantum groups*, The 2000 Twente Conference on Lie Groups. Acta Appl. Math. **73** (2002), 155–173.
- [4] V. Toledano Laredo, *Quasi–Coxeter algebras, Dynkin diagram cohomology and quantum Weyl groups*, math.QA/0506529.