

# Quantum Group Symmetries and Non-Local Currents in 2D QFT

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**Abstract.** We construct and study the implications of some new non-local conserved currents that exist in a wide variety of massive integrable quantum field theories in 2 dimensions, including the sine-Gordon theory and its generalization to affine Toda theory. These non-local currents provide a non-perturbative formulation of the theories. The symmetry algebras correspond to the quantum affine Kac–Moody algebras. The  $S$ -matrices are completely characterized by these symmetries. Formal  $S$ -matrices for the imaginary-coupling affine Toda theories are thereby derived. The application of these  $S$ -matrices to perturbed coset conformal field theory is studied. Non-local charges generating the finite dimensional Quantum Group in the Liouville theory are briefly presented. The formalism based on non-local charges we describe provides an alternative to the quantum inverse scattering method for solving integrable quantum field theories in 2d.

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