

# Yang-Baxter $\sigma$ -models, conformal twists, and noncommutative Yang-Mills theory

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## Abstract

© 2017 American Physical Society. The Yang-Baxter  $\sigma$ -model is a systematic way to generate integrable deformations of  $AdS_5 \times S^5$ . We recast the deformations as seen by open strings, where the metric is undeformed  $AdS_5 \times S^5$  with constant string coupling, and all information about the deformation is encoded in the noncommutative (NC) parameter  $\Theta$ . We identify the deformations of  $AdS_5$  as twists of the conformal algebra, thus explaining the noncommutativity. We show that the unimodularity condition on  $r$ -matrices for supergravity solutions translates into  $\Theta$  being divergence-free. Integrability of the  $\sigma$ -model for unimodular  $r$ -matrices implies the existence and planar integrability of the dual NC gauge theory.

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