Four-loop universal anomalous dimension of the Wilson operators in N=4 SUSY

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Results for the foor-loop universal anomalous dimension of Wilson twist-2 operators in the N=4 Supersymmetric Yang-Mills model are presented. These results are obtained from the recently proposed dressed, asymptotic Bethe ansatz for the planar AdS/CFT system. They show that the validity of the asymptotic Bethe ansatz is indeed limited at weak coupling by operator wrapping effects. This is done by comparing the Bethe ansatz predictions for the four-loop anomalous dimension of finite-spin twist-two operators to BFKL constraints from high-energy scattering amplitudes in N=4 gauge theory. The observed disagreement means that the ansatz breaks down for twist-two operators at four-loop order. Our method supplies precision tools for multiple all-loop tests of the veracity of any yet-to-be constructed set of exact spectral equations. It is preneded also a conjecture for the exact four-loop anomalous dimension of the family of twist-two operators, which includes the Konishi field.