

Institut Ruđer Bošković
ZAVOD ZA TEORIJSKU FIZIKU
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SERIJA PREDAVANJA U SKLOPU SEMINARA ZAVODA ZA TEORIJSKU
FIZIKU

(Zajednički seminari Zavoda za teorijsku fiziku,
Zavoda za eksperimentalnu fiziku IRB-a i Fizičkog odsjeka PMF-a)

A primer on integrable techniques for 1D quantum systems

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Abstract:

One dimensional systems are intrinsically strongly interacting and require approaches beyond perturbation theory to be described. Some such models are known to be integrable and have paved the way to understand the universality of general low-dimensional systems. In this series of lectures I will present the basic ideas behind Bethe Ansatz integrability, through the example of the 1D Heisenberg chain and the XXZ chain. In the first two lectures I will introduce the model and the technique and use the coordinate Bethe Ansatz to construct the phase diagram of the model and discuss its low-energy excitations. In the third lecture I'll make a detour by solving a 2D classical statistical model, the six-vertex model, because its solution justifies the Algebraic Bethe Ansatz (ABA) techniques to solve the Heisenberg chain that will be the topic of the forth lecture. ABA overcomes the shortcomings of the coordinate approach and truly shows what is the nature of quantum integrability.

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