

# SEMPARIS – Séminaires en région parisienne

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## Séminaire de physique mathématique

**Lundi 11 Décembre 2017, 11 :00**

IPHT, Salle Claude Itzykson, Bât. 774

Domaines : math-ph

Titre : *Inhomogeneous quantum quenches in the XXZ chain via six-vertex model with domain boundary conditions*

Orateur : **Jean-Marie Stéphan**

Résumé : *I consider a simple out-of-equilibrium setup where a 1d quantum spin system on the infinite lattice is prepared in a domain wall product state, and then let evolve unitarily with the Hamiltonian of the XXZ spin chain. I explain how this “quantum quench” problem is related to the six-vertex model by analytic continuation, and how quantum inverse scattering methods on the six vertex side may be exploited to both derive exact results and gain some insights on such inhomogeneous quenches. I focus in this talk on the simplest quantity, the Izergin-Korepin partition function of the classical model, which becomes a return probability (RP) after the quench, and may be expressed in the form of a Fredholm determinant. In the gapless regime, the decay of the RP at late times is found to be gaussian, with a rate that is, surprisingly, nowhere continuous as a function of anisotropy. Exactly at the Heisenberg point, the decay is exponential in  $\sqrt{t}$ , strongly suggesting diffusive transport.*

*This particular quench also serves as an opportunity to discuss alternative approaches such as the generalized hydrodynamic treatment of integrable systems, or closely related problems such as arctic curves for dimer coverings, and conformal field theory description of 1d inhomogeneous systems.*

Reference : *arXiv :1707.06625*

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