Laboratoire de Physique Théorique et Hautes Energies

Unité Mixte de Recherche (UMR 7589) de Sorbonne Université et du CNRS

SEMINAIRE du LPTHE

Vendredi 21 Décembre 2018, 11:00

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Restricted spectra in exactly solvable supersymmetric spin chains : the long-range t-J model

We compute the exact partition function of the one-dimensional su(1|m) supersymmetric t-J model with long-range interactions, in the presence of an external magnetic field and a charge chemical potential. To this end, we use the equivalence of this model to a suitable modification of the su(1|m) Haldane-Shastry spin chain with chemical potential terms. In this way, we also obtain a complete analytical description of the spectrum of the long-range t-J model in terms of the supersymmetric version of Haldane's motifs and their related skew Young tableaux and skew Schur polynomials. As an application, we give a complete description of the different ground state phases, characterized by their spin content – i.e., su(1|2), su(1|1) and su(0|2), apart from the trivial phases consisting only of holes or fermions of one type.

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