« Atelier sur l'information quantique et mécanique statistique quantique »
15 au 19 octobre 2018

"Workshop on Quantum Information and Quantum Statistical Mechanics"
October 15-19, 2018

Lieb-Schultz-Mattis type theorems for quantum spin chains without continuous symmetry

Yoshiko Ogata *

yoshiko@ms.u-tokyo.ac.jp

We prove that a quantum spin chain with half-odd-integral spin cannot have a unique ground state with a gap, provided that the interaction is short ranged, translation invariant, and possesses time-reversal symmetry or $\mathbb{Z}_2 \times \mathbb{Z}_2$ symmetry (i.e., the symmetry with respect to the π rotations of spins about the three orthogonal axes). The proof is based on the deep analogy between the matrix product state formulation and the representation of the Cuntz algebra in the von Neumann algebra $\pi(\mathscr{A}_R)''$ constructed from the ground state restricted to the right half-infinite chain.

This is a joint work with Hal Tasaki.

*School of Sciences, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, 113-0033, JAPAN