



量子物理学・ナノサイエンス第 283 回セミナー

Integrable dissipative spin chains

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概要

We study two models of dissipative spin chains that can be mapped to integrable non-Hermitian models. The first model is a quantum compass chain with bulk dephasing. I will show that the Liouvillian of the system can be diagonalized exactly by mapping it to a non-Hermitian Kitaev model on a two-leg ladder. The relaxation time and the autocorrelation function of edge spins exhibit different behavior depending on whether the quantum compass Hamiltonian is in a trivial or a topological phase. The second model is a quantum Ising chain with a particular form of the bulk dissipation. In this case, the Liouvillian turns out to be a non-Hermitian Ashkin-Teller model, which can be further mapped to an XXZ spin chain with purely imaginary anisotropy Δ . In both cases, we obtain exact results for the steady states and the Liouvillian gap (the inverse relaxation time) by exploiting the integrability of the systems.

[1] Naoyuki Shibata and Hosho Katsura, Phys. Rev. B **99**, 174303 (2019).

[2] Naoyuki Shibata and Hosho Katsura, Phys. Rev. B **99**, 224432 (2019).

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