Universität Basel

Publication

ac magnetization transport and power absorption in nonitinerant spin chains

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 119845
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Year 2008
Title ac magnetization transport and power absorption in nonitinerant spin chains
Journal Physical Review Letters
Volume 101
Number 1
Pages / **Article-Number** 017202

We investigate the ac transport of magnetization in nonitinerant quantum systems such as spin chains described by the XXZ Hamiltonian. Using linear response theory, we calculate the ac magnetization current and the power absorption of such magnetic systems. Remarkably, the difference in the exchange interaction of the spin chain itself and the bulk magnets (i.e., the magnetization reservoirs), to which the spin chain is coupled, strongly influences the absorbed power of the system. This feature can be used in future spintronic devices to control power dissipation. Our analysis allows us to make quantitative predictions about the power absorption, and we show that magnetic systems are superior to their electronic counterparts.

Publisher American Physical Society
ISSN/ISBN 0031-9007
edoc-URL http://edoc.unibas.ch/dok/A5254606
Full Text on edoc No;
Digital Object Identifier DOI 10.1103/PhysRevLett.101.017202
PubMed ID http://www.ncbi.nlm.nih.gov/pubmed/18764149
ISI-Number 000257424700061
Document type (ISI) Journal Article