Spin mediated energy transport in 1D spin systems

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The magnetic excitation spectra of spin chains are known to be characteristically different for S = 1/2 and S = 1 systems. On theoretical grounds, also the characteristics of spin- and energy transport properties of these systems are expected to be different. For chains with a Heisenberg type antiferromagnetic (HAFM) coupling between the S = 1/2 spins, the energy transport is expected to be ballistic, resulting in, e.g., an infinite thermal conductivity under ideal conditions. Less clear is the situation for S = 1, HAFM spin chains, but it has been argued that in this case, the spin mediated energy transport is diffusive.
Recent results of measurements of the thermal conductivities of S = 1/2, as well as S = 1 model compounds with spin chain type structural elements will be presented and discussed. The results suggest that both the spin- and the energy transport are characteristically different in these two types of spin chain systems.