

Abstract Submitted
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Thermal conductivity of quasi-one-dimensional antiferromagnetic spin-chain materials SASHA CHERNYSHEV, ALEX ROZHKOV, UC Irvine — We study heat transport in quasi-one-dimensional spin-chain systems by considering the model of one-dimensional bosonic spin excitations interacting with three-dimensional phonons and impurities in the limit of weak spin-lattice coupling and fast spin excitations. A combined effect of the phonon and impurity scatterings yields the following spin-boson thermal conductivity behavior: $\kappa_s \propto T^2$ at low, $\kappa_s \propto T^{-1}$ at intermediate, and $\kappa_s = \text{const}$ at higher temperatures. Our results agree very well with the existing experimental data for Sr_2CuO_3 . We predict an unusual dependence on the impurity concentration for a number of observables and propose further experiments.

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