«بسمه تعالی»

Watching magnons fly: Magnetic heat transport in quantum spin chain and spin ladder compounds

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چکیده

Low dimensional quantum magnets show an unusually high thermal conductivity originating from the magnetic excitations in these compounds. The conductivity is highly anisotropic and dwarfs the usual phonon contribution, making low dimensional quantum magnets highly relevant for heat management in electronic devices. The present work focuses on optical methods to study and control the heat conduction in magnetically low dimensional cuprate systems as for instance found in the magnetic chain compounds $SrCuO_2$ and Sr_2CuO_3, and the so-called telephone number ladder compounds $(La,Sr,Ca)_{14}Cu_{24}O_{41}$. Magnon heat conduction can be visualized using time resolved luminescence microscopy techniques, yielding direct information on both the magnitude and the anisotropy of the heat diffusion in these materials, even when in thin film form. In addition a more bulk sensitive optical transient diffusion technique will be discussed.
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