Seminar

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Magnetocaloric effect in frustrated quantum antiferromagnets

Due to the magnetocaloric effect, adiabatic changes of the magnetic field applied to a magnet yield a change of temperature. We discuss recent theoretical results for the magnetocaloric effect in the vicinity of field-induced quantum phase transitions in quantum spin systems. Geometrically frustrated magnets are of special interest since they exhibit large entropies at low temperatures, promising a large magnetocaloric effect. Comparative theoretical studies of different one- and two-dimensional quantum magnets show that lower temperatures can indeed be achieved by adiabatic (de)magnetization of a frustrated system.
For example, on the kagom\'e lattice, one finds a large number of zero- and low-energy excitations, giving rise to enhanced cooling. These results suggest applications of frustrated quantum magnets for efficient low-temperature magnetic refrigeration.

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