

# The spin-1/2 frustrated helicoidal antiferromagnetic multiferroic system $\text{LiCuVO}_4$ : Recent Results

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Lately much attention has been focused on the magnetic and especially the multiferroic properties of the helicoidal quantum antiferromagnet  $\text{LiCuVO}_4$ . The spin-1/2  $\text{Cu}^{2+}$  ions of  $\text{LiCuVO}_4$  form one-dimensional chains. Spin frustration in  $\text{LiCuVO}_4$  brought about by competing nearest-neighbor ferromagnetic exchange  $J_1$  and the next-nearest-neighbor antiferromagnetic exchange  $J_2$  in these chains leads to helicoidal antiferromagnetic ordering and multiferroic behavior below about 2.5 K. I report and discuss new inelastic and elastic neutron scattering results in which we have studied the two-spinon and the four-spinon continuum and the magnetic structure with and without an electric field by polarized neutron diffraction.[1,2] I also review a recent controversy on the magnitude of the nearest-neighbor and next-nearest neighbor exchange interaction which we resolved by a careful re-investigation of the low-temperature crystal structure, the high-temperature magnetic susceptibilities and new DFT calculations.[3]

[1] M. Enderle, B. Fåk, H.-J. Mikeska, R. K. Kremer, A. Prokofiev, and W. Assmus, *Phys. Rev. Lett.* **104**, 237207 (2010).

[2] M. Mourigal, M. Enderle, R. K. Kremer, J. M. Law, and B. Fåk, *Phys. Rev. B* **83**, 100409(R) (2011).

[3] H.J. Koo, C. Lee, M.-H. Whangbo, G. J. McIntyre and R. K. Kremer, *Inorg. Chem.*, in press.

\* work done in close collaboration with

M. Enderle, B. Fåk, M. Mourigal, H.-J. Mikeska, H.-J. Koo, C. Lee, G. J. McIntyre, M.-H. Whangbo, J. M. Law