

High-Field Magnetic Phase of the $S=1/2$ Frustrated Chain Antiferromagnet LiCuVO_4

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A new high magnetic field phase transition was found in magnetization measurements of the frustrated $S=1/2$ chain compound LiCuVO_4 just below the saturation field, which is about 45 T. This magnetic phase could be a spin nematic, resulting from a condensation of two magnon bound states. The spin-nematic phase was predicted theoretically in the $S=1/2$ linear chain model with the nearest neighbor ferromagnetic and the next nearest neighbor antiferromagnetic exchange interactions. From theoretical considerations, the nematic phase should be realized in a magnetic field range below saturation field. The slope of magnetization in the high field phase is in good agreement with a calculated in a realistic quasi 2-dimensional model of the spin-nematic phase.¹ We compare the observed phase diagram with theoretical predictions and discuss the possibility of the spin nematic phase.

¹M. E. Zhitomirsky and H. Tsunetsugu, Europhys. Lett. **92** 37001 (2010).