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Competition between Spin Nematic and Spin Density Wave Orders in Spatially Anisotropic Frustrated Magnets in Magnetic Fields
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— Magnetic multipolar order including spin nematic order is one of the current topics in frustrated magnetism. Recently, frustrated spin chains with ferromagnetic nearest-neighbor coupling J1 and antiferromagnetic next-nearest-neighbor one J2 have been theoretically shown to exhibit multipolar quasi long-range orders in the wide region of J1/J2 as an external magnetic field is applied. In addition, it is known that several kinds of quasi one-dimensional cuprates can be described by this J1-J2 spin chain. Particularly, a recent experiment shows that LiCuVO4, one of the cuprates, possesses a new phase near saturation and it is expected to be a spin nematic ordered phase. Motivated by these results, we have completed the field-temperature phase diagram for spatially anisotropic magnets consisting of weakly coupled J1-J2 spin chains, by making use of accurate results of the single J1-J2 spin chain. The phase diagram contains spin nematic and spin-density-wave ordered phases, and these two orders compete with each other. We will discuss some universal features of the phase diagram and the relevance of our result to LiCuVO4.

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