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High-field magnetization studies of spin-dimer behaviors on low-dimensional spin systems, $LiCu_{2-x}Zn_xO_2$ and $FeTe_3O_7X$ (X = Cl, Br) J.L. HER, Division of Natural Science, Chang Gung University, Taiwan, H.C. HSU, Institute of Physics, Academia Sinica, Taiwan, Y.H. MATSUDA, K. KINDO, Institute for Solid State Physics, The University of Tokyo, Japan, C.C. CHOU, H.D. YANG, Department of Physics, National Sun Yat-Sen University, Taiwan, H. BERGER, Institutes of Physics of Complex Matter, EPFL, Lausanne, Switzerland, F.C. CHOU, Center for Condensed Matter Sciences, National Taiwan University, Taiwan — High-field magnetization of two kinds of low-dimensional spin system was studied in pulsed magnets. Several anomalies were clearly observed in dm/dH curves of doped $LiCu_{2-x}Zn_xO_2$ (x = 0.07) at low temperatures (1.3 K $< T <$ 20 K). When temperature decreases, the anomalies sharper / splits at certain critical temperatures which are related to the formation of isolated spin-dimer and spin freezing state. A field-induced spin density wave state was suggested to exist at high magnetic fields. The doping of Zn^{2+} ions breaks the spin-chain of Cu^{2+} ions, leading to the formation of isolated spin-dimers and lowering the critical field of formation of spin density state. The magnetization process measurements were preformed on another series of samples, $FeTe_3O_7X$ (X = Cl, Br), which has spin-dimer, formed by Fe^{3+} ions, at low temperatures and magnetic fields up to 100 T. At low temperatures, the magnetization processes show four step-like structures, which have nearly equal spaces of 25 T. Both samples show similar behavior. These steps are considered to be the magnetic excitation of the antiferromagnetic spin-dimers.

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