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Characterization of multipolar liquid phases in frustrated spin chains from NMR relaxation rate MASAHIRO SATO, RIKEN, TOSHIYA HIKIHARA, Hokkaido Univ., TSUTOMU MOMOI, AKIRA FURUSAKI, RIKEN — Recently, it has been shown that spin nematic (quadrupolar) or higher multipolar correlation functions exhibit a quasi long-range order in the broad region of the field-induced Tomonaga-Luttinger-liquid (TLL) phase in spin-1/2 zigzag chains. We point out [1] that the temperature dependence of the NMR relaxation rate $1/T_1$ in these multipolar TLLs is qualitatively different from that in more conventional TLLs of one-dimensional quantum magnets such as the spin-1/2 Heisenberg chain; $1/T_1$ decreases with lowering temperature in multipolar TLL. This behavior can be used as an indirect but definite signature for identifying the multipolar order. We also discuss some characteristic features of the field dependence of $1/T_1$ and spin dynamical structure factors. [1] M. Sato, T. Momoi, and A. Furusaki, PRB79, 060406(R) (2009).

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