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Effective field theory with a θ-vacua structure for 2d spin systems AKIHIRO TANAKA, XIAO HU, National Insitute for Materials Science — We derive a new 2+1d nonlinear sigma (NLσ) model description for coupled spin chains with competing AF-VBS orders, incorporating methods developed recently by ourselves and by Senthil and Fisher. The resulting 2+1d $O(4)$ NLσ model contains a topological θ-term whose vacuum angle θ varies continuously with δ, the bond-alternation strength of the interchain interaction. This implies that the θ-vacua structure for this NLσ model can be explored by tuning δ in a suitable 2+1d spin system, as in the case of the 1+1d AF spin chains with bond-alternation. We discuss the implications for frustrated spin systems. A. Tanaka and X. Hu, Phys. Rev. B**74**, 140407 (2006).

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