

Tuesday April 19, 12pm
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Higher-rank U(1) spin liquid by design, with experimental applications

Fracton-related phases of matter have attracted tremendous attention in recent years. Compared to the exciting progress on the theoretical side, experimental realizations are still rare. In this talk, we discuss two approaches to construct classical higher-rank U(1) spin liquid: 1. via manipulating multiple copies of conventional U(1) spin liquid [1] and 2. via higher-rank vortex-charge duality [2]. On the theory side, these results lend us insights into a more general program of classifying classical spin liquids. On the experimental front, some of our constructions are highly realistic: there are known materials [3,4] that have interactions very close to our ideal models.

[1] H Yan, et al., PRL 124, 127203

[2] H Yan, J Reuther, arXiv:2112.10676

[3] C. Balz, et al., Nature Physics 12, 942 (2016).

[4] J. G. Rau, et al., PRL. 116, 257204 (2016).