Séminaire de physique statistique

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Orme des Merisiers Salle Claude Itzykson, Bât. 774

Symmetry-protected classifications in spin systems — by bulk constructions

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Symmetry plays an essential role in the classification of condensed matter phases, e.g. symmetry-protected topological phases. In this talk, we introduce a different symmetry-based classification of condensed matter field theories–two field theories belong to the same class if their underlying lattice theories can differ by a local symmetry-preserving interaction. Such a classification encodes a universal information of renormalization-group flow and the permitted criticality of a certain lattice system. We propose an artificial bulk-construction approach, which serves as a useful classification detector. As an example, all the field theories of translation-invariant $SU(N)$ spin systems have a Z_N classification. As a future direction, a refined classification within those trivial classes is expected in even dimensions.

This talk is based on the following works:
1 - Yao, Hsieh, and Oshikawa, Phy. Rev. Lett. 123, 180201 (2019);
2 - Yao and Oshikawa, arXiv: 1906.11662;
3 - Yao, arXiv: 1911.04425.