



Istituto Nazionale di Fisica Nucleare

Bologna Workshop on:

## CFT AND INTEGRABLE MODELS

and their applications from gauge/gravity dualities to statistical mechanics and quantum information



Contribution ID: 76

Type: **Invited talk**

## The Frustration of Being Odd

Tuesday, 5 September 2023 09:50 (30 minutes)

We consider the effects of so-called Frustrated Boundary Conditions (FBC) on quantum spin chains, namely periodic BC with an odd number of sites. In absence of external fields, FBC allow for the direct determination of correlation functions that signal a spontaneous symmetry breaking, such as the spontaneous magnetization. When paired with anti-ferromagnetic interactions, FBC introduce geometrical frustration into the system and the ground state develops properties which differ from those present with other boundary conditions, thus bringing striking, yet puzzling, evidence that certain boundary conditions can affect the bulk properties of a 1D system. We argue that FBC introduce long-range order in the system, similar to that enjoyed by SPT phases, and add a sizable amount of complexity to the ground state. Our results prove that even the weakest form of geometrical frustration can deeply affect a system's properties and pave a way for a bottom-up approach to better understand the effects of frustration and their exploitations also for technological purposes.

- J. Phys. Commun. 3, 081001 (2019);
- Nature's Comm. Phys. 3, 220 (2020);
- New J. Phys. 22 083024 (2020);
- J. Phys. A 54 025201 (2020);
- Sci Rep 11, 6508 (2021);
- Phys. Rev. B 103, 014429 (2021);
- Phys. Rev. B 105, 064408 (2022);
- Phys. Rev. B 105, 184424 (2022);
- SciPost Phys. 12, 075 (2022);
- Phys. Rev. B 106, 125145 (2022);
- arXiv:2209.10541; & work in progress

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