



INVITATION

as part of the Mathematical Physics Theory Seminar

to the online talk by

Fabio APRUZZI
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on

***“Aspects of generalized symmetries from string theory:
symmetry theories and generalized charges”***

Abstract:

Symmetries are crucial in any physical system, as they define the theoretical model that describes it. For instance, symmetries play a fundamental role in quantum field theory (QFT), both in defining the QFT and in constraining its dynamics. The full power of symmetries has only been exploited very recently through the introduction of a generalized notion of symmetry. For example, generalized symmetries have been used to theoretically describe many phases of QFT in terms of symmetry realization, such as confinement. This generalization hinges on recognizing that the notion of conservation extends to the topological nature of the symmetry operator. It leads to higher-form symmetries, higher groups, and non-invertible symmetries. In my talk, I will first introduce how these symmetry structures are conveniently described by a $(d+1)$ -dimensional topological field theory, whose topological defects encode both the symmetry generators (whether invertible or non-invertible) and the generalized charges. This framework is called symmetry topological field theory (SymTFT), or more generally, symmetry theories. Additionally, it has been recently observed that string theory branes in geometric engineering and holography have a striking connection with generalized global symmetries. I will explain how branes, in a certain topological limit, not only furnish the symmetry generators but also encode the so-called Symmetry Topological Field Theory (SymTFT). After introducing the general setup, I will exemplify this for QFT with finite generalized (non-)invertible symmetries. Finally, I will extend this prescription to non-finite symmetries. In particular, I will discuss the symmetry theory (SymTh) for non-invertible symmetries with transformation parameters in \mathbb{Q}/\mathbb{Z} , which also appear in 4D particle physics.

Time: Tuesday, 19 November 2024, 2:00 p.m.

Location: Erwin-Schrödinger Lecture Hall, 1090 Vienna, Boltzmannngasse 5, 5th floor