

Bethe Colloquium

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A two-dimensional window into non-perturbative physics

Quantum field theories at strong coupling exhibit a host of phenomena that are not immediately visible to perturbation theory. One surprising feature is that, beside point particles, the degrees of freedom of strongly coupled QFTs in some cases include two-dimensional, string-like excitations. In the case of supersymmetric theories, which are the subject of this talk, string theory provides a natural setup for studying this class of extended objects, which are realized by wrapping membranes in an internal space. I will argue that the string-like degrees of freedom are powerful probes into the physics of strongly coupled QFTs, which encode detailed and often subtle properties about their particle spectrum and symmetries in a natural way. The existence of these string-like excitations gives rise to a rich interplay between quantum field theory, the enumerative geometry of the internal space, and the theory of modular forms. In the course of the talk we will also see how the properties of various classes of modular forms one encounters, which encode the spectrum of excitations of the strings, are intimately tied to the properties of the quantum field theories where they arise.

BCTP, Room W 2.019 - Wegelerstr. 10 - 53115 Bonn

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