SFB-Seminar (Research Project C5)

TIME:
9 Jun 2015, 15:00 - 18:00

LOCATION:
Humboldt-Universität zu Berlin
IRIS Gebäude, Vortragsraum 2.07
Zum Großen Windkanal 6
12489 Berlin-Adlershof

PROGRAM:

15:00 - 15:30 Coffee Break

15:30 - 16:30 **Dr. Jacob Bourjaily (Nils Bohr Institute, Copenhagen)**

Grassmannian Geometry of Scattering Amplitudes

The past several years have been witness to an ongoing revolution in our understanding of (perturbative) quantum field theory. In particular, a concrete proposal now exists for how to reformulate any theory recursively without any reference to virtual particles, gauge redundancies, or any of the other unphysical baggage that so complicates computation within the traditional formalism. In addition to greatly simplifying the work involved, the recursive reformulation provides an important connection between field theory and the geometry (and combinatorics) of certain subspaces of the Grassmannian a connection that has proven extremely fruitful for both physics and mathematics in recent years. Because both sides of this connection are greatly simplified (and best understood) in the case of planar, maximally supersymmetric Yang-Mills, this will be the primary example discussed.

I will provide a broad introduction to these ideas, starting from basic principles of quantum mechanics alone. No prior familiarity with supersymmetric theories or Grassmannian geometry will be assumed.

16:30 - 17:00

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Coffee Break

17:00 - 18:00 **Dr. Oliver Schlotterer (AEI, Potsdam)**

The number theory of superstring amplitudes

This talk explores the cross fertilization between number theory and superstring perturbation theory. I will first discuss multiple zeta values and their relations from the viewpoint of iterated integrals on a genus zero surface. They enter the alpha' expansion of superstring tree amplitudes in a pattern that can be understood in terms of their generating series and Hopf algebra structures. We will then proceed to iterated integrals on a torus which give rise to elliptic analogue of multiple zeta values. They are shown to find a natural appearance in one-loop amplitudes of the open superstring.

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