

# Kolleg Mathematik Physik Berlin

Interdisciplinary Center for Research in Mathematical Physics

## KMPB – Day

February 20<sup>th</sup>, 2017

IRIS-Haus Adlershof, Room 2.07

### 10 am On the universal twisted elliptic KZB connection

*Martin González, Université Pierre-et-Marie-Curie, Paris*

Analogously to the genus 0 case, where the universal KZ connection has a cyclotomic version, the universal elliptic KZB connection has a twisted counterpart. This is a connection defined on the moduli space  $\mathcal{M}_{1,n}^{\Gamma}$  of  $\Gamma$ -structured elliptic curves with  $n$  marked points, where  $\Gamma = \mathbb{Z}/M\mathbb{Z} \times \mathbb{Z}/N\mathbb{Z}$  with  $M, N \geq 1$ . After defining these moduli spaces (and the twisted configuration spaces associated to them) I will construct principal bundles with a flat connection over them. Then I will show how we can retrieve elliptic multiple zeta values at torsion points (cf. Goncharov) from some regularized holonomies of the universal twisted elliptic KZB connection, when restricted to the twisted configuration spaces. This is a joint work with my thesis advisor Damien Calaque.

### 11 am The string theory effective action and exceptional field theory scattering amplitudes

*Axel Kleinschmidt, Max-Planck-Institute for Gravitational Physics (Albert-Einstein-Institute), Golm/Potsdam*

The string theory effective action is an object that generates string theory scattering amplitudes at low energies. Rather than computing it directly from string theory amplitudes it is sometimes possible to constrain certain terms in it from other considerations and thereby obtaining indirect information about string theory amplitudes. One way of implementing these constraints is by using the framework of exceptional field theory that makes certain string theory symmetries manifest. I will review the general idea for this and present specific computations. Based on work with Guillaume Bossard.

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### 2 pm Superstring scattering amplitudes in genus one

*Federico Zerbini, Max-Planck-Institute for Mathematics, Bonn*

The Feynman diagram expansion of scattering amplitudes in perturbative superstring theory can be written as a series of integrals over compactified moduli spaces of Riemann surfaces with marked points, indexed by the genus. Therefore in genus 0 it is reasonable to find, as it often happens in QFT computations, periods of  $\mathcal{M}_{0,N}$ , which are known to be multiple zeta values. In this talk I want to report on recent advances in the genus 1 amplitude, which are related to the development of 2 different generalizations of classical multiple zeta values, namely elliptic multiple zeta values and conical sums.