# SAGEX Kickoff Meeting

# Report of Contributions

Contribution ID: **37**                                    Type: **not specified**

# Integrability, Scattering Amplitudes, and the Breaking of Yangian Invariance

*Tuesday, 4 September 2018 10:15 (45 minutes)*

**Presenter:** STAUDACHER, Matthias (Humboldt- Universität zu Berlin)

**Session Classification:** Research Talks

Contribution ID: **38**                                         Type: **not specified**

# Playful Constructions in Double Copy Predictions (a story about stories)

*Tuesday, 4 September 2018 15:30 (45 minutes)*

**Presenter:** CARRASCO, John Joseph (CEA Saclay)

**Session Classification:** Research Talks

Contribution ID: **40** Type: **not specified**

# Supergravity at Five Loops

*Tuesday, 4 September 2018 14:30 (1 hour)*

**Presenter:** BERN, Zvi (UCLA)

**Session Classification:** Research Talks

Contribution ID: **41**                                    Type: **not specified**

# Iterative non-iterative Integrals in Higher Loop Calculations

*Tuesday, 4 September 2018 11:30 (45 minutes)*

**Presenter:** BLÜMLEIN, Johannes (DESY Zeuthen)

**Session Classification:** Research Talks

Contribution ID: **42**                                    Type: **not specified**

# Symbolic Summation and Integration Tools for Feynman Integrals

*Tuesday, 4 September 2018 12:15 (45 minutes)*

**Presenter:**  SCHNEIDER, Carsten (RISC (Linz) & RISC GmbH)

**Session Classification:**  Research Talks

Contribution ID: **43** Type: **not specified**

# Volker Schomerus (DESY)

**Session Classification:** Research Talks

Contribution ID: 44        Type: **not specified**

# Amplitudes on plane wave backgrounds

*Wednesday, 5 September 2018 10:15 (45 minutes)*

We set up the study of scattering amplitudes on both gravitational and gauge theory plane wave backgrounds. We do so with a view to exploring the double copy in a semi-nonperturbative framework and to extend the ambi-twistor string formulae to fully curved backgrounds. We give a double copy prescription at three points, and a version of the curved background BCJ relations at four points. We also discuss memory effects and tails of waves.

**Presenter:** MASON, Lionel (University of Oxford)

**Session Classification:** Research Talks

Contribution ID: 45                                             Type: **not specified**

# Classical effective action of dilaton gravity as the double copy of Yang-Mills theory

*Wednesday, 5 September 2018 11:30 (45 minutes)*

I will review the computation of the effective gravitational action in the post-Minkowskian and post-Newtonian approximation by „classically"integrating out the gravitational field in the path integral. It is then shown how this result for dilaton gravity may be easily obtained through a suitable adaption of the BCJ double copy construction applied to the computation of the effective action for two color charged classical particles in Yang-MIlls theory. It is a summary of our recent paper 1807.09859.

**Presenter:**   PLEFKA, Jan (Humboldt-Universität zu Berlin)

**Session Classification:**   Research Talks

Contribution ID: **47**                                    Type: **not specified**

# N=4 SYM amplitudes and cosmic Galois theory

*Wednesday, 5 September 2018 14:30 (1 hour)*

Scattering amplitudes in planar N=4 super-Yang-Mills theory are dual to light-like polygonal Wilson-loop expectation values. In many cases their perturbative expansion can be expressed in terms of multiple polylogarithms that also obey certain single-valuedness conditions or branch cut restrictions. The rigidity of this function space, together with a few other conditions, allows one to construct the six-point amplitude – or hexagonal Wilson loop – through 6 loops. Derivatives of the amplitude can then be used to explore the minimal space of functions expected to contain all such amplitudes, and the structure of the coproduct (or coaction) of its associated Hopf algebra. There is strong evidence that a certain co-action principle is obeyed, which restricts in particular the number of multiple zeta values and alternating sums that can appear.

**Presenter:**   DIXON, Lance (SLAC)

**Session Classification:**   Research Talks

Contribution ID: **48**                                  Type: **not specified**

# Correlators in N=4 SYM at weak and strong coupling

*Wednesday, 5 September 2018 15:30 (45 minutes)*

I will give an overview of what is known about 4 point correlators of half BPS operators in N=4 SYM both at weak and strong coupling. At weak coupling - in the planar limit - the integrands are known explicitly to 10 loops and give combinations of amplitude integrands at any number of points. It is conjectured that all information needed to extract all n-point l-loop amplitudes is contained in the four-point correlator. These (and higher point) integrands are conjectured to be equivalent to a geometric object the "correlahedron". At strong coupling the correlators are dual via AdS/CFT to graviton amplitudes in IIB string theory on AdS_5 x Sˆ5. We bootstrap these supergravity amplitudes at 1 loop, using recently found tree-level amplitudes, via OPE techniques on the dual CFT side.

**Presenter:** HESLOP, Paul (Durham University)

**Session Classification:** Research Talks

Contribution ID: **49**                                      Type: **not specified**

# Soft limits and Asymptotic Symmetries

*Wednesday, 5 September 2018 16:45 (45 minutes)*

**Presenter:** MCLOUGHLIN, Tristan (Trinity College Dublin)

**Session Classification:** Research Talks

Contribution ID: **50**                                                Type: **not specified**

# Direct Solutions of IBP Systems

*Thursday, 6 September 2018 09:30 (45 minutes)*

In this talk, I present recent work on solving integration-by-parts (IBP) systems for simplifying Feynman integrals. I'll give a brief review of IBP, and also review the idea of generating vectors which block-diagonalize IBP systems. I then present recent work on conjugate polynomials, which fully diagonalize such systems. I also present an application to generating recurrence relations for arbitrary powers of irreducible numerators in Feynman integrals.

**Presenter:** KOSOWER, David (CEA Saclay)

**Session Classification:** Research Talks

Contribution ID: **51** Type: **not specified**

# QCD splitting functions and cusp anomalous dimensions at four loops

*Thursday, 6 September 2018 10:15 (45 minutes)*

**Presenter:** MOCH, Sven (Universität Hamburg)

**Session Classification:** Research Talks

Contribution ID: **52**  Type: **not specified**

# Gravity Amplitudes and General Relativity

*Thursday, 6 September 2018 11:30 (45 minutes)*

We will discuss the treatment of general relativity as an effective field theory and discuss recent progress for computation. We will use results for amplitudes to derive theoretical predictions in general relativity.

**Presenter:**   BJERRUM-BOHR, Emil (NBI Copenhagen)

**Session Classification:**   Research Talks

Contribution ID: **53**                                                          Type: **not specified**

# Form factors from N=4 SYM to Higgs+gluon amplitudes

*Thursday, 6 September 2018 12:15 (45 minutes)*

**Presenter:** BRANDHUBER, Andreas (Queen Mary University of London)

**Session Classification:** Research Talks

Contribution ID: **54** Type: **not specified**

# Colloquium: Some features of scattering amplitudes in string theory and quantum field theory (Prof. Michael Green, Cambridge University & QMUL)

*Thursday, 6 September 2018 14:30 (1 hour)*

This talk will provide an overview of some properties of scattering amplitudes in superstring theory and their connections to amplitudes in conventional quantum field theory. The talk is aimed to be comprehensible to graduate-level physicists, an well as more advanced researchers.

**Session Classification:** Colloquium

Contribution ID: **55**          Type: **not specified**

# Transcendental Functions and Integrability

*Wednesday, 5 September 2018 12:15 (45 minutes)*

**Presenter:** SCHOMERUS, Volker (DESY)

**Session Classification:** Research Talks

Contribution ID: **56** Type: **not specified**

# Welcome (Prof. Bill Spence, Vice Principal for Research, QMUL)

*Tuesday, 4 September 2018 10:10 (5 minutes)*

**Session Classification:** Research Talks

Contribution ID: **57**                                                Type: **not specified**

# Opening (Prof. Gabriele Travaglini)

**Session Classification:**   SAGEX Network Meetings

Contribution ID: **58**　　　　　　　　　　　　　　　　　　Type: **not specified**

# Ove Scavenius (Danske Bank)

*Friday, 7 September 2018 09:20 (10 minutes)*

**Session Classification:** SAGEX Network Meetings

Contribution ID: **59** Type: **not specified**

# Andrei Petrovskii (DreamQuark)

*Friday, 7 September 2018 09:30 (10 minutes)*

**Session Classification:** SAGEX Network Meetings

Contribution ID: **60** Type: **not specified**

# Ekaterina Eremenko (EE Films)

*Friday, 7 September 2018 09:40 (10 minutes)*

**Session Classification:** SAGEX Network Meetings

Contribution ID: **61** Type: **not specified**

# Erik Postma (Maplesoft)

*Friday, 7 September 2018 09:50 (10 minutes)*

**Session Classification:** SAGEX Network Meetings

Contribution ID: **62**                                               Type: **not specified**

# Devendra Kapadia (Wolfram Research)

*Friday, 7 September 2018 10:00 (10 minutes)*

**Session Classification:**   SAGEX Network Meetings