T 11: QCD (Theorie) 1
Convenor: Steffen Schumann

Zeit: Dienstag 16:45–19:00   Raum: VG 3.103

T 11.1   Di 16:45   VG 3.103

Nächstführende QCD Korrekturen zu Higgs-Signaturen in der Topquarkpaarproduktion am LHC — Werner Bernreuther[1], •Peter Galler[2], Oliver Kaleske[1] und Peter Uwer[2] — [1]Institut für Theoretische Teilchenphysik und Kosmologie, RWTH Aachen, D - 52056 Aachen, Germany — [2]Institut für Physik, Humboldt-Universität zu Berlin, Newtonstrasse 15, D-12489 Berlin, Germany

Spin-Observablen können verwendet werden, um Signaturen einer schweren Spin-Null (Higgs) Resonanz, die in Topquark-Paare zerfällt, detaillierter zu untersuchen. Theoretische Analysen wurden bisher nur in führender Ordnung der starken Wechselwirkung durchgeführt. Unter Verwendung eines effektiven Vertex für die Higgs-Gluon-Gluon Kopplung sollen nun auch nächstführende QCD Effekte berücksichtigt und deren Auswirkung auf spinabhängige Observablen untersucht werden.

T 11.2   Di 17:00   VG 3.103

Top Tagging — •Felix Kling[1], Tilman Plehn[1], Michihisa Takeuchi[1], Michael Spannowsky[2], and Dirk Zerwas[3] — [1]Institut für Theoretische Physik, Universität Heidelberg, Germany — [2]Institute for Particle Physics Phenomenology, Department of Physics, Durham University, United Kingdom — [3]LAL, IN2P3/CNRS, Orsay, France

Searches for new physics in the top sector can shed additional light on the structure of the Standard Model at and above the weak scale. Many extensions of the Standard Model predict top partners or heavy resonances decaying to boosted top quarks. The HEPTopTagger identifies top quarks inside large and massive jets. Similarly, we can approximately reconstruct leptonically decaying boosted tops. We show recent results from performance studies and new applications of such boosted top searches.

T 11.3   Di 17:15   VG 3.103

Electroweak gauge-boson production at small transverse momentum — •Daniel Wilhelm — Johannes Gutenberg-Universität Mainz

Using soft-collinear effective theory (SCET), one can factorize the cross section for electroweak gauge-boson production at hadron colliders and resum large logarithms to all orders. The naive factorization is broken by a collinear anomaly (CA), which leads to infrared safety at vanishing transverse momentum.

T 11.4   Di 17:30   VG 3.103

Jets in LHC Searches — Christoph Englert[1,2], Erik Gerwick[3,4], Tilman Plehn[1], •Peter Schichtel[1], and Steffen Schumann[1,3] — [1]Institut für Theoretische Physik, Universität Heidelberg, Germany — [2]Institute for Particle Physics Phenomenology, Department of Physics, Durham University, United Kingdom — [3]II. Physikalisches Institut, Universität Göttingen, Germany — [4]SUPA, School of Physics & Astronomy, The University of Edinburgh, Scotland

Jets with missing energy is a striking signature for new physics at the LHC. It confronts us with large Standard Model backgrounds like Z/W+jets and QCD jet. We can describe these backgrounds in terms of staircase scaling of the exclusive number of jets. The theoretical errors for this scaling are well under control. We can furthermore test staircase scaling and its relation to Poisson scaling in photon plus jets production. In inclusive new physics analyses the effective mass yields complementary information. We use a log-likelihood analysis for SUSY benchmark points to show the power of our approach.

T 11.5   Di 17:45   VG 3.103

Origins of Jet scaling and applications to new physics — •Erik Gerwick — Physikalisches Institut II., Göttingen, DE

Multi-jet final states are ubiquitous at the LHC and understanding these rates precisely is crucial in searches for new physics. We present recent work extrapolating jet rates through universal jet scaling patterns and reveal the underlying mechanism by which QCD produces such patterns. Finally, we list some of the specific applications to ongoing LHC experiments.

T 11.6   Di 18:00   VG 3.103

An Analytic Initial State Parton Shower — Wolfgang Kilian[2], Jürgen Reuter[1], and •Sebastian Schmidt[1] — [1]DESY, Standort Hamburg — [2]Universität Siegen

We present an algorithm for a refined version of a final-state parton shower and a completely new one for an initial-state shower. These showers allow to reweight shower histories, as the complete weights for the showered events are explicitly known. We compare these algorithms using an implementation in the event generator WHIZARD to results from existing showers as well as data from the LEP, Tevatron and LHC colliders.

T 11.7   Di 18:15   VG 3.103

Colour Reconnection in Herwig++ — •Christian Röhr[1], Stefan Gieseke[1], and Andrzej Siodmok[2] — [1]Karlsruhe Institut of Technology, Karlsruhe, Germany — [2]The University of Manchester, Manchester, United Kingdom

As the LHC's quick step-up in luminosity necessarily comes with increasing pile-up activity accompanying every event of interest, the Monte Carlo event generators have to come up with proper models of soft inclusive hadron collisions. Moreover, an irreducible background of hadronic activity, the underlying event, is adherent to the single hard hadron collisions themselves.

We report on colour reconnection in Herwig++, which provides improvements in these two fields of current research.

T 11.8   Di 18:30   VG 3.103

Correlations in Multi-Parton Interactions — •Tomas Kasemets and Markus Diehl — DESY, Hamburg, Germany

Many interesting effects of multi-parton interactions are present already in double parton scattering. The two hard scatterings are correlated via double parton densities. We examine the double Drell-Yan process and the impact of the correlations on the differential cross section. One interesting result is that the spin of the interacting quarks correlate the decay planes of the two vector bosons.

T 11.9   Di 18:45   VG 3.103

Ein Programm zur Berechnung von Single-Top-Quark Wirkungsquerschnitten in hadronischen Kollisionen — •Patrick Rieck — Humboldt-Universität zu Berlin

Die Produktion einzelner Top-Quarks in elektroschwachen Prozessen bietet einzigartige Möglichkeiten für Tests des Standardmodells der Elementarteilchen und seiner möglichen Erweiterungen. Insbesondere die pp-Kollisionen am LHC liefern hohe Ereignisraten für die Single-Top-Produktion. Es wird ein Programm vorgestellt, das die Berechnung des totalen Wirkungsquerschnitts für diese Prozesse ermöglicht. Aufbauend auf entsprechender Software zur Berechnung der Top-Antitop-Quark-Paarproduktion (HATHOR), wurden aktuelle Berechnungen zur Single-Top-Produktion implementiert. Um einen aussagekräftigen Vergleich experimenteller Daten mit diesen Berechnungen zu gewährleisten, bietet das Programm ein hohes Maß an Flexibilität, beispielsweise hinsichtlich der verwendeten Faktorisierungs- und Renormierungsskala, der Parton-Dichte-Funktionen und der Top-Quark-Masse.