T 29: QCD II

Zeit: Dienstag 16:45–19:00 Raum: HG X

T 29.1 Di 16:45 HG X

Suppression of beam-induced and cosmic background in the Atlas detector using jet clean-up cuts — •Florian Ahles, Bernhard Meirose, and Gregor Herten — Albert-Ludwigs Universität, Freiburg

We have studied the suppression of fake jets arising from beam-induced background and cosmic rays by using jet quality cuts. Beam halo, beam gas or cosmic ray jets have particular features that are distinguishable from QCD jets. Monte Carlo samples modelling QCD dijet, beam gas, beam halo and cosmic events as well as cosmic and single beam data from fall 2008 are used for this study. Several jet variables are tested for their discriminative power. The results are compared to existing studies and furthermore the selection is optimized using multivariate techniques.

T 29.2 Di 17:00 HG X

Beam-background studies in the ATLAS detector — •Bernhard Meirose and Florian Ahles — Physikalisches Institut, University of Freiburg

One of the key signatures for new physics, in the ATLAS detector, rely on a good measurement of the missing transverse energy (MET). Therefore any sources of MET generate backgrounds to SUSY. Examples are: beamgas interactions and beam halo muons. We present preliminary results on beam-gas and beam-halo studies using Monte Carlo and single-beam data taken in September 2008 and November 2009. Clean-up cuts are developed using calorimeter and tracking information and a reasonable discrimination against QCD events is obtained.

T 29.3 Di 17:15 HG X

Underlying-Event-Studien mit Jets mit dem CMS-Experiment — Kerstin Borras, •Alexander Flossdorf, Hannes Jung, Albert Knutsson, Mira Krämer, Niladri Sen und Dmytro Volyanskyy — Deutsches Elektronen-Synchrotron, Hamburg, Deutschland

Bei den Protonkollisionen am LHC am CERN können mehr als nur zwei Partonen miteinander wechselwirken, wobei meist eine hochenergetische Parton–Parton-Interaktion von mehreren Wechselwirkungen mit geringeren Energien begleitet wird. Eine sorgfältige Analyse der hierbei auftretenden Effekte ist für die Interpretation der Daten essentiell, da insbesondere zusätzliche Jets erzeugt werden können, die nicht mit dem eigentlichen harten Prozess assoziiert sind.

In der päsentierten Studie werden die mit dem CMS-Experiment genommenen Daten im Hinblick auf Effekte überlagerter Parton–Parton-Wechselwirkungen untersucht. Dafür werden Messungen bei verschiedenen Schwerpunktsenergien kombiniert und die Eigenschaften zusätzlicher Jets analysisert. Die Ergebnisse werden mit verschiedenen in Monte-Carlo-Ereignisgeneratoren implementierten Modellen verglichen.

T 29.4 Di 17:30 HG X

Underlying Event Messung mittels Kalorimeterjets im CMS Experiment am LHC — Marcel Kunze[1], •Oliver Oberst[1,2], Günter Quast[2] und Klaus Rabbertz[2] — [1]Steinbuch Centre for Computing - KIT — [2]Institut für Experimentelle Kernphysik - KIT

Zusätzlich zur harten Interaktion in Proton-Proton Kollisionen am LHC enthalten die gemessenen Kollisionsereignisse Energiebeiträge aus weiteren Prozessen, wie zum Beispiel die Wechselwirkung zwischen den Protonenbruchstücken oder die Abstrahlungen im Anfangszustand. Diese Interaktionen werden je nach Definition im Underlying Event zusammengefasst. Eine genaue Messung dieser, von der Energie der Kollision abhängenden, zusätzlichen Aktivität im CMS Detektor, ist äußerst wichtig bei diversen Untersuchungen wie zum Beispiel der Messung des inklusiven Jetwirkungsquerschnitts.
Bei der Messung des Underlying Events bedient man sich in Zwei-Jet-Ereignissen, bei denen die Teilchenjets in entgegengesetzte Richtungen abgestrahlt werden, des Jets mit dem höchsten transversalen Impuls. In einem Winkelabschnitt transveral zu diesem Jet werden dann die Underlying Event Observablen, Transversalimpulsdichte und Spurenhäufigkeit bestimmt und gegenüber dem Transveralimpuls des führenden Jets aufgetragen. Im CMS Experiment wurde diese Analyse bisher für Jets aus Teilchenspuren ausgewertet. Für Ereignisse mit Jets höheren Transversalimpulses wurde diese Analyse nun mit Jets aus Kalorimetermessungen für verschiedene Jetalgorithmen erweitert.

T 29.5 Di 17:45 HG X

Measurement of Charged Particle Production in p-p Collisions at LHC — •Gerhard Brandt — Deutsches Elektronen-Synchrotron

In late November 2009 the LHC produced first proton-proton collisions at a centre-of-mass energy of $\sqrt{s} = 900$ GeV. Before Christmas 2009 a statistically meaningful sample of events was recorded by the experiments. An essential early measurement possible with these data is the analysis of minimum bias events. They can be used to understand the detectors and confirm results from from earlier experiments. This talk gives an overview over the analysis within the ATLAS collaboration. First results on charged particle production in inelastic minimum bias events at LHC are shown.

T 29.6 Di 18:00 HG X

Transverse Momentum of Charged Particles in low-Q^2 DIS at HERA — •Anastasia Grebenyuk — DESY, Hamburg, Germany

The electron-proton collider HERA allows deep inelastic scattering (DIS) at very small bjorken x of about 10^{-5}. At such a small x the gluons dominate among the proton partons and a parton dynamic beyond DGLAP is expected to become important. It is believed that semi-inclusive DIS measurements with the hadrons in the final state may offer sensitive means to discriminate the various possible parton dynamics. One of such measurements, the measurement of charged particle transverse momentum spectra, is presented in this report.

The measurement is performed in different x and Q^2 kinematic bins and the results are compared to various Monte Carlo models, either with (DGLAP) or without (beyond DGLAP) ordering of the transverse momentum of the gluons emitted by the parton before its hard scattering with the virtual photon.

It is demonstrated, that the observed hardness of the spectra at relative high hadron's transverse momenta tells in favor of the later, beyond DGLAP, parton dynamic.

T 29.7 Di 18:15 HG X

New developments in event generator tuning techniques — •Holger Schulz[1], Andy Buckley[2], Hendrik Hoeth[3], Heiko Lacker[1], and Jan Eike von Seggern[1] — [1]Humboldt University, Berlin — [2]University of Edinburgh, UK — [3]IPPP Durham, UK

Data analyses in hadron collider physics depend on background simulations performed by Monte Carlo (MC) event generators. However, calculational limitations and non-perturbative effects in strong interactions require approximate models with adjustable parameters. In fact, we need to simultaneously adjust ("tune") many phenomenological parameters in a high-dimensional parameter-space in order to make the MC generator predictions fit the data.

I will present extensions and improvements of the systematic approach to MC tuning, called PROFESSOR (PROcedure For Estimating SyStematic errORs), whose key idea is to construct a fast analytic model of a MC generator response under parameter variations which can then be easily fitted to data. Among the improvements are a robust estimate of tuning uncertainties as well as a graphical user interface that allows for interactive exploration of the behaviour of observables under shifts in parameter space.

T 29.8 Di 18:30 HG X

Monte-Carlo Tuning with Genetic Algorithms and MPI for Minimum Bias events at the LHC — •Sami Kama — DESY, Zeuthen, Germany

Monte-Carlo generators are essential tools in high energy physics. We use them on various points such as background estimation, trigger design and new physics searches. Because of our understanding of physics and the technical challenges they usually implement models which have some tunable parameters. By fine-tuning these parameters description of the data can be improved and more precise measurements can be made. Soft interactions called minimum bias events are one of the such places where tuning of several parameters are required. With approximately 20 minimum bias interactions at each bunch crossing at full luminosity at the LHC, it is crucial that we understand them in order

to study interesting events. In this talk we will present a new approach to Monte-Carlo tuning by using Genetic Algorithms and distributed analysis with Message Passing Interface and give an example of tuning Pythia for minimum bias events.

T 29.9 Di 18:45 HG X

Initial tuning of PYTHIA to the first data recorded by LCHb — •Dmitry Popov, Osvaldo Aquines, Markward Britsch, Florin Maciuc, and Michael Schmelling — Max Planck Institute for Nuclear Physics in Heidelberg, Germany

The acceptance of the LHCb in the pseudorapidity range 2< eta <5 is complementary to that of the other larger LHC experiments. Inclusive distributions as a function of rapidity, pseudorapidity and transverse momentum for positive and negative charged particles based on the first data recorded by the LHCb detector are compared to minimum bias Monte Carlo predictions. A first tuning of fragmentation paremeters for the PYTHIA generator will be presented.