Summary of Relevant Experience

PD Dr Hannes Jung

Deutsches Elektronen Synchrotron (DESY)
Notkestr 85, 22603 Hamburg, Germany
E-mail: hannes.jung@desy.de;
URL: www.desy.de/~jung

Physics Analysis

2018 –	Convener of the LHCEW working group on Jets and electroweak bosons
2016 – 2017	Convener of Physics Analysis group "Standard Model Physics with Jets" group in CMS
2013 – 2015	Convener of Monte Carlo group "Physics Comparison and Generator Tunes" group in CMS
2010 – 2011	Convener of "Forward Physics Analysis" group in CMS
2010 – now	Data analysis in CMS:
	Measurement of inclusive jets at large p_t
	Measurement of azimuthal correlations $\Delta\phi$ in high p_t dijet events
	Measurement of heavy flavored jets (b-jets and top-jets)
	Measurement of forward energy flow
	Measurement of forward jet cross section
2000 – 2010	Data analysis in H1:
	Measurement of D^* cross section
	Measurement of underlying event and multiparton interaction in γp and DIS
	Measurement of forward jet cross sections
since 2015	Supervision of PhD theses in the Standard Model area in CMS
2008 – 2015	Supervision of PhD theses in forward physics in CMS
2004 – 2010	Supervision of diploma and PhD theses in heavy quark production at H1.
2003 – 2005	Convener of the physics working group "Diffraction" in H1.
2002	Supervision of the analysis of *forward jet* events at H1.
2000 – 2001	Analysis of mini-jet events to study the parton dynamics at small x in non-diffractive and diffractive deep inelastic scattering.
1996 – 2000	Analysis of diffractive di-jet production at HERA
	Analysis of di-jet events in deep inelastic scattering and resolved virtual photons, including measurement of the di-jet rate and azimuthal asymmetries.
1994 – 1996	Analysis of deep inelastic diffractive events at H1
	Measurement of the diffractive contribution to the proton structure function F_2 and analysis of di-jet events in deep inelastic diffractive scattering.
1991 – 1993	Convener of the physics working group "Heavy Flavors" at H1.
1988 – 1993	Studies for energy calibration of the H1 LAr calorimeter during data taking with $ep \to e' J/\psi X$ and $ep \to e' p' l^+l^-$
	Studies for the measurement of the gluon density at HERA and LEP-LHC using J/ψ photo-production
	Analysis of J/ψ events at H1 (HERA)
1984 – 1987	Analysis of *single photon* events at CELLO (PhD thesis)

Phenomenology

2013 –	Development of a scheme to solve the coupled evolution equations (DGLAP and CCFM) with a Monte Carlo method and determination of the (unintegrated) Transverse Momentum Dependent (TMD) parton densities
2008 –	Extension of the CASCADE Monte Carlo generator to include processes relevant for LHC, like forward jets, Drell-Yan and Higgs production
2008 – 2009	Chair and Convener of the Monte Carlo group in the analysis center of the Helmholtz Alliance "Physics at the Terascale"
2004 – 2008	Chair of the HERA-LHC workshop and contributions to studies concerning a better understanding and measurements of the unintegrated gluon density.
2002 – 2003	Studies of non-leading corrections to the CCFM evolution equation. New sets of unintegrated gluon densities were obtained from precision fits to the structure function F_2 as measured by the H1 and ZEUS collaborations. First attempts to calculate Higgs production at LHC energies in the k_t -factorization approach using the CCFM unintegrated gluon densities.
2001 – 2002	Extension of the Monte Carlo generator CASCADE to describe also $p\bar{p}$ processes. In the framework of k_t -factorization supplemented with the CCFM evolution equation, $b\bar{b}$ at the Tevatron and also partially at HERA can be consistently described
1999 – 2002	Close collaboration with B. Andersson, G. Gustafson and L. Lönnblad (Department of Theoretical Physics, Lund, Sweden) for a better understanding of the different approaches to implement the CCFM equation into Monte Carlo generators. A *Lund Small x* workshop was organized in march 2001. Together with colleagues from Moscow studies for a deeper understanding of the k_t factorization approach (supported from the Royal Academy of Science, Sweden)
1999 – 2001	Intensive studies for a consistent implementation of NLO calculations into the Monte Carlo generator RAPGAP in collaboration with J. Collins, Penn State University. For the first time the $\mathcal{O}(\alpha_s)$ processes are combined via a special subtraction scheme with *initial* and *final* state parton showers, making the standard p_t -cut obsolete.
1998 – 2001	Intensive studies of the CCFM evolution equation for a theoretically well based description of small x hadronic final state properties. A unique solution of the CCFM equation which allows to describe the inclusive structure function F_2 and the forward jet cross sections simultaneously was obtained. Development of a new hadron level Monte Carlo program CASCADE, which includes consistently the CCFM evolution equation
1998 – 1999	Initiative for a workshop on *Monte Carlo Generators for HERA physics* with the aim to develop a better theoretical basis as well as a consistent implementation of $\mathcal{O}(\alpha_s)$ and $\mathcal{O}(\alpha_s^2)$ processes into Monte Carlo event generators.
1996 – 2000	Extension of the RAPGAP Monte Carlo generator into a general multi-purpose program, including also the simulation of non-diffractive processes. Implementation of the concept of resolved photons in DIS was implemented for a very good description of most phenomena not described by other standard DIS Monte Carlos making RAPGAP one of the most frequently used event generators by the H1 and ZEUS experiments, for diffraction, for jet analyzes and for heavy flavor production as well. Continuous dialog with experimentalists from both H1 and ZEUS experiments on ongoing analyzes and the interpretation of the measurements.
1994 – 1996	Development of the new Monte Carlo generator RAPGAP for events with large rapidity gaps in deep inelastic *ep* scattering as the first event generator fully suitable for deep inelastic diffraction and is extensively used in the analyzes of deep inelastic diffraction by the H1 and ZEUS experiments at HERA.
1988 – 1993	Development of the new Monte Carlo generator EPJPSI for J/ψ production in γp, ep , μp and *pp* collisions including all production mechanisms at high energies. Improvement of the model for inelastic J/ψ photo-production using relativistic corrections Uniform description of elastic, diffractive and inelastic J/ψ photo-production.

Detector Development and Hardware

2007 – 2008	Initiator for participation of the DESY group in the CMS CASTOR calorimeter for forward jets and small x physics, participation in CASTOR test beam measurements
1992 – 2007	Shift leader duties in the H1 experiment
1992	Run Coordinator of the H1 experiment
1988 – 1993	Construction of a wheel of the electro-magnetic lead - LAr calorimeter for H1 including treatment of glueing read-out boards on lead
	Final installation of the LAr calorimeter and putting it into operation
	Maintenance of the high voltage system of the LAr calorimeter during data taking and on-call expert
1984 – 1987	Scientific maintenance (electronics, trigger, read-out and calibration) of the liquid argon calorimeter at the CELLO experiment at PETRA, DESY (Hamburg).
	Development and installation of a calorimeter trigger with very low energy threshold for detecting “single photon” events with the CELLO detector.
1982 – 1983	Construction and test of a system of multi-wire-proportional chambers for the EMC experiment.

Chair/Convener of Workshops since 1995

2016	Organizing and Program Committee of the Resummation, Evolution, Factorization (REF) workshop in Antwerp
2015	Chair of the Resummation, Evolution, Factorization (REF) workshop at DESY
2015	Chair of the Monte Carlo school of Terascale Alliance
2014	Initiator and co-chair of the Resummation, Evolution, Factorization (REF) workshop in Antwerp
2012	Chair of the workshop MPI@LHC
2011	Chair of the workshop MPI@LHC
2009	Chair of Monte Carlo school of Terascale Alliance
2008	Chair of Monte Carlo school of Terascale Alliance
2008	Chair of the workshop ``International Symposium on multiparton dynamics " ISMD08
2007	Chair of the workshop ``Elastic and diffractive scattering - forward physics and QCD "
2003 – 2008	Initiator and chair of the workshop ``HERA and the LHC "
2003 – 2006	Convener of the physics working group ``Diffraction" in H1.
April 2002	Coordinator of the working group ``Diffraction", DIS 2002, Cracow, April 2002.
March 2001	Chair and coordinator of the `` Lund Small x workshop"
2000	Convener of the working group ``QCD and Simulation" at the THERA workshop (combination of TESLA with HERA).
1999 – 2001	Chair and coordinator of a project on *Small x phenomenology* involving physicists from Russia and the Lund theory group. This project is financed and supported by the Royal Swedish Academy of Science.
1998 – 1999	Initiator and chair of the workshop *Monte Carlo Generators for HERA physics* and editor of the proceedings.
1995 – 1996	Convener of the working group on *Diffractive Hard Scattering* at the workshop on Future Physics at HERA.
1991 – 1993	Convener of the physics working group *Heavy Flavors* at H1.
April 1995	Convener of the working group on *Proton and Photon Structure and Diffractive Interactions* at the workshop on *Deep Inelastic Scattering and QCD*, Paris, April 1995.

Supervision of doctoral theses

2018 – Luis Ignacio Banos (Hamburg U.)

2017 – Jindrich Lydirch (Hamburg U.)

2016 – Armando Bermudez Martinez (Hamburg U.)

2016 – Daniela Dominguez Damiani (Hamburg U.)

2015 – 2018 Patrick Connor (Hamburg U.)

Precision measurement of the inclusive b jet production in proton-proton collisions with the CMS experiment at the LHC at ps = 13 TeV

2015 – 2018 Aleksandra Lelek (Hamburg U.)

Determination of TMD parton densities from HERA data and application to pp processes

2015 – 2017 Juan Manuel Grados Luyando (Hamburg U.)

Charged particle spectra in different final states at s√=13 TeV with the CMS Experiment

2011 – 2014 S. Dooling (Hamburg U.)

Differential Cross Section Measurement of Drell-Yan Production and associated Jets with the CMS Experiment at the LHC

2011 – 2014 P. Gunnellini (Hamburg U. and Antwerp U.)

Study of double parton scattering using four-jet scenarios in proton-proton collisions at s=7 TeV with the CMS experiment at the Large Hadron Collider

2010 – 2014 P. Cipriano (Hamburg U.)

Forward - Central Jet Correlations in pp Collisions at CMS

2009 – 2013 A. Grebenyuk (Hamburg U.)

Analysis of charged particles in H1

2008 – 2016 M. von den Driesch (Hamburg U.)

On parton showers and multi parton interactions

2008 – 2011 N. Sen (Hamburg U.)

Measurement of the Energy Flow at Large Pseudorapidities at the Large Hadron Collider using the Compact Muon Solenoid

2007 – 2010 T. Toll (Hamburg U.)

MC@NLO for Heavy Flavor Photoproduction at HERA

2006 – 2010 Z. Staykova (Hamburg U.)

Measurement of D^* mesons with two jets in photoproduction with the H1 detector at HERA

2006 – 2009 M. Deak (Hamburg U.)

Transversal momentum of the electroweak gauge boson and forward jets in high energy factorization at the LHC

2005 – 2011 A. Cholewa (Hamburg U.)

Measurement of charm cross section at low Q^2 in H1

2005 – 2009 Ll. Marti (Hamburg U.)

Multiple Parton Interactions in Photoproduction at HERA/H1

2004 – 2008 S. Vinokurova (Hamburg U.)

Diffractive Photoproduction of Charm at HERA

2004 – 2005 G. Flucke (Hamburg U)

Photoproduction of D^* Mesons and D^* Mesons Associated with Jets at HERA

2003 – 2007 M. Hansson (Lund)

Determination of the unintegrated gluon density at HERA

2002 – 2007 A. Knutsson (Lund)

Study of parton dynamics at small x at HERA

1998 – 2001 M. Davidsson (Lund)

Jet production and parton dynamics in deep inelastic scattering

1996 – 2000 M. Lindström (Lund)

Measurement of azimuthal asymmetries in the hadronic final state of deep inelastic

scattering at HERA

1996 – 2003 M. Karlsson (Lund)

Jet reconstruction and its application in studies of parton dynamics

1995 – 1997 B. Laforge (Saclay)

Etude des événements a di-Jets dans la diffusion profondément inélastique avec large intervalle de rapidité dans l'expérience H1 auprès de l'accélérateur HERA

1992 – 1995 D. Krücker (Aachen)

Modelle für die elastische J/ψ-Produktion bei HERA

Supervision of diploma theses

2018 –	M. Schmitz (Hamburg U.)
2008 – 2009	F. von Samson-Himmelstjerna (FU Berlin) *Determination of parton density functions using Monte Carlo event generators*
2005	Z. Staykova (Sofia U.) *Simulations of DIS events containing a charm quark at HERA*
2004 – 2005	A. Cholewa (Hannover U.) *Transverse Momentum of Gluons in ep scattering at HERA*
2004 – 2005	L. Marti (Hamburg U.) *Investigation of heavy Quark and Multiple Interactions at HERA*
2002 – 2003	M. Hansson (Lund) *The Unintegrated Gluon Density in the Photon and Heavy Quark Production*
2001 – 2002	A. Knutsson (Lund) *Forward jet production in events with large rapidity gaps at HERA*
1999 – 2000	S. Schilling (Heidelberg) *Implementation of BGF-processes in Monte Carlo generators for electron proton scattering*
1995 – 1996	M. Karlsson (Lund) *An investigation of the parton momentum distribution in diffractive exchange using high p_t dijets*
1991 – 1993	G. Ihorst (Aachen) *Trigger und Datenanalyse von J/ψ a e^+e^- Ereignissen im H1 - Detektor bei HERA*
1989 – 1991	O. Overbeck (Aachen) *Untersuchungen zur Bestimmung der Gluonstrukturfunktion des Protons*
1989 – 1991	J. Staeck (Aachen) *Kalibration von Schauerzählern für den HERA H1 – Detektor mittels Pion-Teilchenstrahlen*
1989 – 1991	M. Wielers (Aachen) *Heavy Flavor production in ep collisions: a comparison between different MC event generator*
1989 – 1991	T. Jansen (Aachen) *Trigger für J/ψ Ereignisse beim H1 - Detektor*

Supervisor Experience

2009 – 2015	Lecture Course: QCD and Monte Carlos, University Antwerp
2009	Lecture Course: QCD and Monte Carlos, DESY and University Hamburg
2008/2009	Lecture Course: QCD and Monte Carlos, University Antwerp
2005 – 2007	Lecture Course : QCD and collider physics, DESY Hamburg
2005 – 2014	Summerstudent lectures on Monte Carlo simulations, DESY Hamburg
2000 – 2001	Course in High Energy Physics and Cosmology at Lund University
1998	Lecture course in High Energy Physics at Lund University
1993	Seminars on “electron - positron and electron - proton interactions” at Hamburg University
1988 – 1993	Student seminars in high energy physics at Aachen University (RWTH)
	Courses in experimental physics at Aachen University
since 1988	Supervision of diploma and PhD theses at Aachen University (FRG),
	at Saclay (France), at Lund University and at Hamburg University.