



Swiss Institute of
Particle Physics

an Association according to Swiss law

Board 2017-02

Election of a Swiss IPPOG representative

August 2017/AB

Introduction

The International Particle Physics Outreach Group (IPPOG) is a network of scientists, science educators and communication specialists working across the globe in science education and public outreach for particle physics. IPPOG brings new discoveries in this exciting field to young people and conveys to the public that the beauty of nature is indeed becoming understandable from the interactions of its most fundamental parts - the elementary particles.

IPPOG contributes to global efforts in strengthening cultural awareness, understanding and support of particle physics and related sciences and in developing the next generation of researchers. More specifically, IPPOG's purpose is to raise standards of public outreach and science education efforts.

CHIPP has a long-standing history in IPPOG (formerly EPPOG) – to which it adhered in 1997. Claude Joseph (University of Lausanne) was the first Swiss delegate in EPPOG followed by Günther Dissertori, who was the Swiss delegate in EPPOG until 2009. Hans Peter Beck was then elected by CHIPP to represent Switzerland in this organisation and he became the co-chair of IPPOG in January 2013.

IPPOG is now a Collaboration and Hans Peter Beck together with Steve Goldfarb are the Chairpersons. Hans Peter Beck can no longer represent Switzerland in IPPOG, while being Chairperson.

Proposal

The CHIPP Chairman has called for nominations for the position of IPPOG representative the 14 June 2017 and among six candidates nominated the following two are ready to serve:

Katharina Mueller from the University of Zurich

Olaf Steinkamp from the University of Zurich

Their CVs and their brief letters of motivation follow below.

The Board (in conformity with Article 27-e) is invited

- **to elect** Katharina Mueller or Olaf Steinkamp as IPPOG Swiss representative for a 1st term from September 2017 to September 2019.

Required majority: simple

Curriculum Vitae

Katharina Müller



Personal Details

Name Katharina Müller
Born 7. October 1963
Citizen from Zurich
Email kmueller@physik.uzh.ch
Web <http://www.physik.uzh.ch/~kmueller/>

Education

1989 Diploma in Physics, Zurich University, Prof. Dr. D. Brinkmann
Kernspinresonanz unter Druck am Hoch- T_c -Supraleiter $YBa_2Cu_3O_{7-\delta}$ und am Halbleiter $YBa_2Cu_3O_{6+\epsilon}$
1994 PhD in Physics, Zurich University, Prof. Dr. P. Truoel
Measurement of the proton structure function F_2 at low Bjorken x at the H1 experiment

Research Career

2016- Member of the LHCb speakers bureau, deputy chair since October 2016
2013-2015 Co-convener of the LHCb working group 'QCD, electroweak and exotica'
2007-today University of Zurich, Senior Researcher
H1 experiment (leader of the analysis group on isolated photons)
since 2010 member of the LHCb collaboration working on analyses with electroweak bosons and Drell-Yan production
2003-2007 University of Zurich, Research Assistant
H1 experiment: upgrade of trigger chamber, analysis of isolated photons, leader of the analysis group on isolated photons
2000-2003 University of Zurich, SNF Profil Stipendium (21-52505.97)
Analysis of the structure of the photon
1998-2000 University of Heidelberg, Research assistant, Prof. Dr. F. Eisele
HERA-B experiment: production and system tests for Microstrip Gas Chambers
H1 experiment: upgrade of z-vertex trigger
1995-1998 Postdoc at DESY (Hamburg)
H1 experiment: development of L4 trigger software, analysis of isolated photons

Outreach

2015-today Science Lab UZH (30%), responsible for outreach activities in physics for schools
2016-today Responsible for outreach activities of the Physics department
2016 International Physics Olympiad 2016, design of theoretical problems

PhD students

- *Tracking and Particle Identification at LHCb and Strange Hadron Production in Events with Z Boson*,
Marco Tresch, February 2017
- *Z Bosons in LHCb*,
Albert Bursche, 2014
- *Low mass Drell-Yan Cross Section Measurements with the LHCb Experiment*,
Nicola Chiapolini, 2014
- *The Rare Decays $B(s) \rightarrow \mu^+ \mu^-$ and Z Boson Production at LHCb and Radiation Damage in its Silicon Tracker*,
Christian Elsasser, 2014
- *Prompt Photon Production in Photoproduction at HERA*,
Krzysztof Nowak, 2009
- *Isolated Photon Production in Deep-Inelastic Scattering at HERA*,
Carsten Schmitz, 2007
- *A Search for Excited Quarks with the H1 Detector at HERA*,
Jan Becker, 2005
- *Measurement of the Charged Current Cross Section in Positron-Proton Collisions at HERA*,
Nicole Werner, 2004
- *A Measurement of the QED Compton Cross Section in Electron-Proton Scattering with the H1 Experiment at HERA*,
Nicolas Keller, 2003

Bachelor and Master students

- *Measurement of Open Charm and Double Open Charm Production Cross Sections and Ratios in pp Collisions at $\sqrt{s} = 2.76$ TeV with the LHCb Experiment*,
Enzio Crivelli, 2016
- *Measurement of $\sigma(pp \rightarrow bbX)$ at 8 TeV in the forward region of the LHCb experiment*,
Dario Biasini, 2015
- *Measurement of W production cross section in proton-lead collisions*,
Chris Marentini, 2014
- *Measurement of the Zy production cross section at $\sqrt{s} = 8$ TeV at the LHCb experiment*,
Moritz Küng, 2014
- *Isolated Photon Production in Deep-Inelastic Scattering at HERA*,
Arno Gadola, 2007
- *Optimierung eines z-Vertex Triggers für den H1 Detektor bei HERA*,
Andreas Schweitzer, 1999 (Heidelberg)

Talks at conferences and workshops (2012-2017)

- *Production measurements at LHCb: Electroweak Bosons, Jets and Heavy Flavor*
Low x 2017, Bari, Italy, June 12 - 18 2017
- *Central exclusive production at LHCb*
Low x 2017, Bari, Italy, June 12 - 18 2017
- *Heavy Flavour and Quarkonia Production at LHCb*
Kruger2016, Mpumulanga, South Africa, December 4 - 9 2016
- *Impact of LHC measurements on parton density functions,*
QCD@LHC, Zurich, Switzerland, August 22 - 26 2016
- *Impact of LHC measurements on parton density functions,*
LHCP 2016, Lund, Sweden, June 13 - 18 2016
- *QCD at colliders,*
DIS, Hamburg, Germany, April 11 - 15 2016
- *LHCb results in proton-nucleus collisions at the LHC,*
STARS 2015, Havana, Cuba, May 10 - 16 2015
- *LHCb results in proton-nucleus collisions at the LHC,*
Kruger 2014, Skukuza, South Africa, December 1 - 5 2014,
- *Central exclusive quarkonia production in the forward region at LHCb,*
Kruger 2014, Skukuza, South Africa, December 1 - 5 2014,
- *Measurements with electroweak bosons at LHCb,*
PANIC, Hamburg, Germany, August 24 - 29 2014
- *LHCb results in proton-nucleus collisions at the LHC,*
PANIC, Hamburg, Germany, August 24 - 29 2014
- *Electroweak and central exclusive measurements in the forward region at LHCb,*
Seminar, Heidelberg, Germany, July 8 2014
- *QCD and electroweak measurements in the forward region at LHCb,*
26th Rencontres de Blois, Blois, France, May 18 - 23 2014
- *Results and prospects on central exclusive production at LHCb,*
Low-x workshop, Rehovot and Eilat, Israel, May 30 - June 4 2013
- *Measurements with electroweak bosons in the forward region at LHCb,*
DESY physics seminars, Hamburg and Berlin, Germany, November 27 and 28 2012
- *Measurements with electroweak bosons at LHCb,*
QCD@LHC, East-Lansing, Michigan, United States of America, August 19 - 24 2012
- *Electroweak results at LHCb,*
CERN seminar, Geneva Switzerland, June 5 2012
- *Electroweak results at LHCb,*
SM@LHC, Copenhagen, Denmark, April 10 - 13 A 2012

Publications with significant own contributions (2012-2017):

- *Heavy Flavour and Quarkonia Production at LHCb*
K. Müller, Kruger proceedings, Journal of Physics Conference Series, 06/2017; 878(1).
DOI:10.1088/1742-6596/678/1/011001.
- *Results from LHCb in 'Centennial of General Relativity'*
K. Müller, Editor C. A. Zen Vasconcellos, World Scientific Publishing Co. Pte. Ltd. (2016),
ISBN 9789814699655
- *QCD at colliders*
K. Müller, DIS proceedings PoS DIS 2016 (2016) 004.
- *Measurement of the forward Z boson production cross-section in pp collisions at $\sqrt{s}=13\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], JHEP 09 (2016) 136, arXiv:1607.06495.
- *Measurement of forward W and Z boson production in pp collisions at $\sqrt{s} = 8\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], JHEP 1601 (2016) 155, arXiv:1511.08039.
- *LHCb results in proton-nucleus collisions at the LHC*
K. Müller, Proceedings of STARS 2015, Astronomische Nachrichten Volume 336, Issue 8-9
773
- *LHCb results in proton-nucleus collisions at the LHC*
K. Müller, Kruger proceedings, Journal of Physics Conference Series 06/2015; 623(1).
DOI:10.1088/1742-6596/623/1/012023.
- *Central exclusive quarkonia production in the forward region at LHCb*
K. Müller, Kruger proceedings, Journal of Physics Conference Series 06/2015; 623(1).
DOI:10.1088/1742-6596/623/1/012022
- *Measurement of the forward Z boson production cross-section in pp collisions at $\sqrt{s} = 7\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], JHEP 1508 (2015) 039, arXiv:1505.07024.
- *Measurement of the forward W boson cross-section in pp collisions at $\sqrt{s} = 7\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], JHEP 1412 (2014) 079, arXiv:1408.4354.
- *Observation of Z production in proton-lead collisions at LHCb*
R. Aaij et al. [LHCb Collaboration], JHEP 1407 (2014) 094, arXiv:1406.2885.
- *Measurement of Feynman-x Spectra of Photons and Neutrons in the Very Forward Direction in Deep-Inelastic Scattering at HERA*
F. D. Andreev et al. [H1 Collaboration], Eur. Phys. J. C 74 (2014) 2915, arXiv:1404.0201.
- *Observation of associated production of a Z boson with a D meson in the forward region*
R. Aaij et al. [LHCb Collaboration], Phys. Rev. Lett. 112 (2014) 131802, arXiv:1401.3245.
- *Study of forward Z + jet production in pp collisions at $\sqrt{s} = 7\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], JHEP 1401 (2014) 033, arXiv:1310.8197.
- *Measurement of the forward energy flow in pp collisions at $\sqrt{s} = 7\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], Eur. Phys. J. C 73 (2013) 2421, arXiv:1212.4755.
- *Inclusive W and Z production in the forward region at $\sqrt{s} = 7\text{TeV}$*
R. Aaij et al. [LHCb Collaboration], JHEP 1206 (2012) 058, arXiv:1204.1620.



Zurich, August 8, 2017

Motivation to candidate as Swiss representative for IPPOG

Since 2015 I am working part time with secondary and high-school students at the Science Lab of the University of Zurich. Besides organising the international Masterclasses I offer courses on magnetism, neutrinos and particle physics and organise tours through the labs of the physics department. Furthermore I am involved in outreach events at our university (Science Info Day, Scientifica). Particle physics offers great opportunities to catch the students attention and get them interested in physics in general but also in the frontier of research.

I really enjoy working with young students, the work is very motivating and gives immediate feedback. In this year alone three of the students that attended courses came back to our institute for their graduation thesis (Maturaarbeit).

Katharina Müller

OLAF STEINKAMP

Privatdozent für Elementarteilchenphysik

Physik-Institut der Universität Zürich ◊ Winterthurerstrasse 190 ◊ 8057 Zürich ◊ Switzerland

+41 44 635 57 63 ◊ olafs@physik.uzh.ch

RESEARCH EXPERIENCE

Senior scientist at Universität Zürich

1999–Present

LHCb experiment at CERN

Zürich

- Led design and construction of Silicon Tracker, principal author of Technical Design Reports.
- Project leader (2005–2008) and deputy project leader (2001–2005, 2014–2017) of Silicon Tracker project.
- Leading Zürich contribution to LHCb detector upgrade.
- Regular shifts as run chief and shift leader.
- Supervising Bachelor, Master and PhD students in hardware and analysis projects.
- Serving on various analysis review committees.
- Member and chair of LHCb Speakers' Bureau (2011–2013).
- Member of LHCb Collaboration Board.

PostDoc at NIKHEF

1996–1999

HERA-B experiment at DESY

Amsterdam and DESY

- Supervised production and quality assurance of detector modules for the tracking system.
- Led installation and commissioning of first tracking station at DESY.
- Coordinated R&D for validation of drift gases.
- Supervised three PhD students in their daily work.
- Represented NIKHEF in HERA-B Collaboration Board.

PostDoc at CEA Saclay

1994–1996

NA48 experiment at CERN

Saclay and CERN

- Responsible for quality assurance of tracking detectors.
- Contributed significantly to installation and commissioning of tracking system at CERN.
- Responsible for operation of tracking system during the first physics runs.

Research grants at INFN Bari, CERN, INFN Genova

1993–1994

PS202 experiment at CERN

CERN

- Contributed to physics analyses.

PhD student at Forschungszentrum Jülich

1990–1993

PS202 experiment at CERN

CERN

- Contributed to quality assurance, installation and commissioning of trigger hodoscope.
- Responsible for operation of trigger hodoscope during physics runs.
- Measured $\bar{p}p \rightarrow \phi\phi$ cross section as a function of center-of-mass energy.

Master student (Diplomarbeit) at Forschungszentrum Jülich

1988–1990

Development of a new type of wire chamber ("Induction Drift Chamber")

Jülich, Germany

- Participated in design and construction of prototype detectors.
- Set up laboratory tests and participated in beam tests at DESY.
- Developed analysis tools and evaluated detector performance.

EDUCATION

Privatdozent für Elementarteilchenphysik Universität Zürich, Switzerland	<i>2015</i>
PhD in physics (Dr. rer. nat.) Universität Bonn, Germany	<i>1993</i>
Master degree in physics (Diplom) Universität Bonn, Germany	<i>1990</i>

TEACHING EXPERIENCE

Courses at graduate level

- Experimental astroparticle physics (2010–2017).
- Flavour physics (2009–2014, CHIPP Winter School 2013).
- Experimental methods in particle physics (2005–2017).

Courses at undergraduate level

- Statistics and data analysis techniques (2005–2017).
- Physics for medical students (2002–2003).
- Nuclear and particle physics (2001–2004).

- Organization of lab courses for physics, biology, chemistry and medical students (2004–2007).
- Lab courses for particle physics students (since 2016).
- Beam experiments at PSI for particle physics students (since 2016).

OTHER RESPONSIBILITIES

Member of Plenary ECFA (since 2013)

LANGUAGES

German	Native speaker.
English, Dutch	Fluent.
French	With German accent.

OTHER INTERESTS

Travelling, photography, classical music, movies.

SUMMARY OF SCIENTIFIC ACHIEVEMENTS

LHCb Experiment

LHCb is one of the four large experiments at the LHC at CERN. Its main goal is the search for physics beyond the Standard Model of particle physics, by performing precise measurements of the decays of hadrons containing b or c quarks. The LHCb collaboration counts more than 1100 members from 69 institutes in 16 countries. I joined the collaboration in 1999, together with the Zurich group, and helped establish the group as an important and highly visible partner in the collaboration. I developed the detector concept for the Silicon Tracker, a system of large-surface silicon micro-strip detectors that are used to reconstruct the trajectories of charged particles in LHCb. I led the R&D efforts for the development of the detectors and was the principal author of the Technical Design Reports. As project leader of the Silicon Tracker project, I was responsible for the timely construction of the detectors in Zurich and at collaborating institutes in Switzerland and Europe as well as for the installation of the detectors in LHCb. I continue to play an active role in the operation of the LHCb experiment, for example by taking shifts as run chief. I initiated and lead the contribution of the Zurich group to the development of the Upstream Tracker, a new silicon micro-strip detector which is foreseen to be installed as part of the LHCb upgrade in 2019/2020.

I have been a member and the chair of the LHCb Speakers' Bureau during the first run of the LHC. In this role, I have been responsible for the organization and rehearsal of more than 300 conference talks for the experiment. I have been member of several analysis review committees, for example of the LHCb measurement of the CP violating asymmetry in $B_s^0 - \bar{B}_s^0$ mixing, which was published in Phys. Rev. Lett. and selected as an Editors' Suggestion in August 2016. I have supervised several Bachelor, Master and PhD students, for example the PhD thesis of Christian Elsasser, which contained the development of a technique for monitoring radiation damage in the Silicon Tracker as well as crucial contributions to the first measurement of the $B_s^0 \rightarrow \mu^+ \mu^-$ branching fraction. The measurement of this branching fraction by LHCb and CMS has been one of the highlights from the LHC so far. It was the first LHC result to be published in Nature.

HERA-B Experiment

HERA-B was an experiment at the HERA storage ring at DESY. The idea of the experiment was to search for CP violation in the $B^0 - \bar{B}^0$ system, employing an internal wire target in the halo or the HERA proton beam to produce large numbers of B^0 and \bar{B}^0 mesons. Although the experiment was ultimately beaten in its endeavour by the two B factories, BaBar and Belle, the experience gained in the development and operation of the HERA-B detectors has provided extremely valuable input for the design and success of LHCb. I worked on the HERA-B experiment from 1996 till 1999. Initially, I led R&D programmes for the validation of drift gases for the tracking detector and set up and supervised the detector production and quality assurance at NIKHEF. I was then based at DESY for two years and led the installation and commissioning of the first tracking station in the experiment.

NA48 Experiment

NA48 at the CERN-SPS was a third-generation experiment searching for direct CP violation in the decays of neutral kaons. The measurements provided the first clear signal of a non-vanishing asymmetry, supporting the Standard Model interpretation of CP violation and ruling out alternative models. I worked on the NA48 experiment from 1994 till 1996. I set up test stands and was responsible for the quality assurance of the tracking detectors. I was based at CERN for several months and contributed significantly to the installation and commissioning of the tracking detectors in the experiment. I was responsible for the operation of the detectors during the first physics runs and developed algorithms for the calibration and alignment of the detector.

JETSET/PS202 Experiment

JETSET/PS202 was an experiment at the CERN Low-Energy Antiproton Ring (LEAR), using an internal gas-jet target to study in-flight $\bar{p}p$ annihilations. Its main goal was to search for possible glueball states in the reaction $\bar{p}p \rightarrow \phi\phi$. I worked on the JETSET experiment as part of my PhD thesis from 1990 till 1993. I made significant contributions to the quality assurance, installation and commissioning of a scintillator trigger hodoscope for the experiment and was responsible for the operation of the detector during the physics runs. I developed a complete analysis chain, starting from the raw detector data, to measure the $\bar{p}p \rightarrow \phi\phi$ cross section as a function of the center-of-mass energy. I produced the first PhD thesis of the experiment and the first consistent analysis of the accumulated data.

Induction Drift Chamber

The Induction Drift Chamber is a gas-based tracking detector for charged particles that was proposed to compete with silicon micro-strip detectors in terms of spatial resolution and rate capability. For my Diplomarbeit in 1989/1990 I developed a prototype detector using (at the time) novel fast analog-to-digital conversion to read out the detector signals. I designed and constructed prototype detectors, set up laboratory test stands, participated in beam tests at DESY, developed analysis tools and evaluated the detector performance.

PRESENTATIONS AT INTERNATIONAL CONFERENCES

- Updated LHCb measurements on pentaquark and tetraquark states
(EPS-HEP: EPS Conference on High Energy Physics, Venice, Italy, July 5-12, 2017)
- Early Career, Gender & Diversity Office at the LHCb experiment
(EPS-HEP: EPS Conference on High Energy Physics, Venice, Italy, July 5-12, 2017)
- Flavour physics reach after upgrade
(LHCP 2017: 5th Annual Large Hadron Collider Physics Conference, Shanghai, China, May 15-20, 2017)
- CP violation in b- and c-hadron decays at LHCb
(Kruger 2016: International Workshop on Discovery Physics at the LHC, Kruger Park, South Africa, December 4-9, 2016)
- The Upstream Tracker for the LHCb upgrade
(HSTD10: 10th International "Hiroshima" Symposium on the Development and Application of Semiconductor Tracking Detectors, Xi'an, China, September 25-29, 2015)
- The LHCb upgrade
(Rencontres du Vietnam: Physics at LHC and Beyond, Quy-Nhon, Vietnam, August 10-17, 2014)
- CP violation and rare decays at LHCb
(16th Lomonosov Conference on Elementary Particle Physics, Moscow, Russia, August 22-28, 2013)
- CP violation at LHCb
(Kruger 2012: International Workshop on Discovery Physics at the LHC, Kruger Park, South Africa, December 3-7, 2012)

SCIENCE EDUCATION AND OUTREACH ACTIVITIES

- Organising and guiding visits to CERN and the LHCb detector for students and school classes.
- Participating in public outreach events in Zurich (Lange Nacht der Forschung, Scientifica).
- Currently in the process of preparing a one-day training programme for high-school physics teachers.

OLAF STEINKAMP

Privatdozent für Elementarteilchenphysik

Physik-Institut der Universität Zürich ◊ Winterthurerstrasse 190 ◊ 8057 Zürich ◊ Switzerland

+41 44 635 57 63 ◊ olafs@physik.uzh.ch

THOUGHTS ON OUTREACH

Outreach, in my opinion, should be an important responsibility for any scientist working on fundamental research. There are different target audiences and for outreach to be effective we need to tailor specific tools and messages that we want to convey for each of these audiences.

- The general public and politicians, on whom we rely for our funding: we want to stimulate their curiosity, raise their interest in what we are doing, demonstrate to them how exciting research in general and our research in particular can be; remind them how curiosity and the sense of exploration are fundamental features of human nature, and how they have contributed to bringing us down from trees, through the Dark Ages to the advanced and civilized societies that we (still) have today; in view of recent developments, maybe more important than trying to teach “facts” may be to promote the importance of the scientific approach: convictions must not be dogmatic but have to be based on reproducible observations, need to be challenged constantly and abandoned if required in view of new evidence;
- Physics teachers (and their pupils), on whom we rely to foster future generations of scientist: we want to help them maintain their enthusiasm for the subject, enable them to stay in touch with cutting-edge science, and help them develop useful tools they can use in the class-room;
- Scientists in other fields of research, on whom we often rely for a fair sharing of funding resources and whom we must be careful not to antagonize: we want to convince them that we are not the giant monster that is trying to steal all their funding and follows strange and incomprehensible rules;
- You, who have to allocate the resources for outreach activities: we need to convince you that putting manpower and financial resources into outreach is not a luxury but an investment that pays off.

IPPOG

I have not had the opportunity to work with IPPOG yet, but I have followed outreach sessions at the latest EPS-HEP conferences and at LHCP (as a side remark, it is encouraging to see that important conferences start to have dedicated outreach sessions now). There are many interesting and promising ideas and initiatives around; I imagine an important and useful role for IPPOG to support initiatives in its member states and to foster communication and exchange of ideas amongst the member states. In view of limited resources, I believe it is important also to develop and introduce common means for evaluating and comparing the impact and “success” of different activities and programmes.

REPRESENTING SWITZERLAND IN IPPOG

In Hans-Peter Beck, Switzerland has had a very active and enthusiastic IPPOG representative. Congratulations to Hans-Peter for his promotion to IPPOG chair. It would be an honour and a challenge to be his successor as Swiss representative. The different linguistic regions of course make Switzerland a particularly interesting country also for outreach activities. I would see it as an important task to try and bring the regions together. A topic I am particularly concerned about is gender balance, and I would make an effort to contribute especially to outreach programmes that aim to reduce the gender gap in (particle) physics. Other roles and tasks were outlined in Tatsuya’s message: regularly attend IPPOG meetings a year; enable IPPOG activities in Switzerland; maintain a nationwide network discussing and disseminating IPPOG matters. On the other hand, I would expect to be able to count on your support in line with the commitments you made by joining IPPOG: to “recognise outreach as an important element of the overall research activity, by providing the needed resources and support to

the representative in IPPOG”; and to “recognise and support those who devote a considerable fraction of their time to educational and outreach efforts by recognising these in a similar manner to those of other aspects of any research program” (quotes from Tatsuya’s message).

THANK YOU
