Claire Prouve

Personal Data

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Date of birth:	16 March 1987	**Nationality:**	German, French

Education

09/2013 - present — **Ph.D. in Experimental Particle physics**
University of Bristol

04/2012 - 06/2013 — **M.Sc. with specialisation in Experimental Particle physics**
RWTH Aachen University (grade *very good*)

09/2010 - 08/2011 — **ERASMUS exchange programme**
Université Paris Sud, participation in the second year master's programme NPAC (Nuclear physics, Particle physics, Astronomy and Cosmology)

10/2006 - 04/2012 — **B.Sc.in Physics with Computer Science as subsidiary subject**
RWTH Aachen University

09/1997 - 08/2006 — **Abitur with specialisation in mathematics and physics**
Gymnasium Horkesgath

Awards and prizes

15/09/2016 — **LHCb Early-Career Scientist Award**
Awarded for the development of the automated alignment of the RICH mirror system within the online data taking framework of LHCb. This was a significant contribution to the novel real-time alignment procedures at LHCb for Run II and to the understanding of the LHCb RICH detectors.

19/08/2006 — **Deutsche Physikalische Gesellschaft Abiturpreis** (book prize)
German physics society prize for pupils with exceptional achievements in physics.

Research Projects

09/2013 - present — **Measurement of the CP even fraction of $D^0 \to \pi^+\pi^-\pi^+\pi^-$ decays at CLEO-c and a determination of observables related to CP violation in $B^\pm \to DK^\pm$ decays at LHCb**
Ph.D. thesis
with Dr. J. Rademacker at the University of Bristol

06/2012 - 06/2013 — **Analysis of the $B_d \to K^{*0}e^+e^-$ decay at LHCb**
Master's thesis
with Dr. M.H. Schune at the Laboratoire de l'Accélérateur Linéaire, Paris

05/2011 - 07/2011 — **Study on the measurement of the CKM angle γ at LHCb using untagged $B_s \to D^0\phi$ events**
Internship - beyond the standard curriculum
with Dr. M.H. Schune at the Laboratoire de l'Accélérateur Linéaire, Paris

07/2011 - 09/2011 **Parametrisation of rigid body dynamics in quaternions**
Bachelor's thesis
with Prof. R. Schmitz at the Institute for theoretical solid state physics (Theory C), RWTH Aachen

04/2008 - 08/2008 **Hardware close programming and calibration of a Charge to Digital Converter (QDC)**
Undergraduate project - beyond the standard curriculum
with Prof. A. Stahl at the III. Physics Institute B, RWTH Aachen

Tasks in the LHCb collaboration

05/2015 - present **RICH mirror alignment expert**
Expert on call for the real-time alignment of the RICH mirrors. Training of collaboration members.

05/2015 - 09/2016 **RICH mirror alignment developer**
Leading the development and implementation of the real-time alignment software for the RICH mirrors.

09/2013 - 04/2015 **MINT software developer**
Developer for the only software capable of modelling a generic n-body decay phase space, which is a critical component of the LHCb physics simulation software.

Primary Publications

forthcoming publication **Model-independent determination of the strong-phase difference between D^0 and $\overline{D^0} \to \pi^+\pi^-\pi^+\pi^-$**
S. Harnew, C. Prouve, J. Rademacker *to be submitted to Physical Review D*

forthcoming publication **Amplitude analysis of $D^0 \to \pi^+\pi^-\pi^+\pi^-$ and $D^0 \to K^+K^-\pi^+\pi^-$ decays using CLEO-c data**
P. d'Argent, *et al. to be submitted to Physical Review D*

07/2015 **First determination of the CP content of $D \to \pi^+\pi^-\pi^+\pi^-$ and updated determination of the CP contents of $D \to \pi^+\pi^-\pi^0$ and $D \to K^+K^-\pi^0$**
S. Malde, *et al. Phys. Lett. B*, Vol. 747, 01.07.2015, p. 9-17

04/2015 **Angular analysis of the $B^0 \to K^{*0}e^+e^-$ decay in the low-q^2 region**
Aaij, R., *et al. J. High Energ. Phys.* (2015) 2015: 64.

05/2013 **Measurement of the $B^0 \to K^{*0}e^+e^-$ branching fraction at low dilepton mass**
Aaij, R., *et al. J. High Energ. Phys.* (2013) 2013: 159.

Posters and Presentations

22/02/2017 **Expanding model independent approaches for measuring the CKM angle γ**
Poster at the LHCC

14/09/2016 **Status of the real-time alignment and calibration activities**
Plenary talk at the LHCb Week in Santiago de Compostela

02/03/2016 **Novel Real-time Calibration and Alignment Procedure for LHCb Run II**
Poster at the LHCC

14/11/2013 **Towards a model-independent measurement of γ through $B^\pm \to D(\to 4\pi)K^\pm$ decays with LHCb and CLEO-c**
Poster at the UK High Energy Physics Forum

04/04/2013 **Photon polarisation in $b \to s\gamma$ using $B_d \to K^* e^+ e^-$ at LHCb**
Poster at the LHC France 2013 conference

05/03/2013 **Analysis of the rare decay $B_d \to K^* e^+ e^-$ at LHCb**
Talk at the 77. Jahrestagung der DPG und DPG-Frühjahrstagung

Additional Training

27-30/06/2015 **LHCb workshop on multi-body decays of B and D mesons**
LHCb workshop with invited theorists focussing on the amplitude analysis techniques for three- and four-body decays of heavy mesons.

10/2011 - 09/2012 **TANDEM Mentoring Programm, RWTH Aachen**
Selected for participation in the mentoring programme for talented female students and Ph.D. students. Participation in several trainings aiming at enlarging professional competences and developing key qualifications. Dr. Tatsuya Nakada as a personal mentor.

7-14/07/2011 **Trans-European School of High Energy Physics**

18-19/11/2008 **Training for Roberta® workshop -leaders**
Acquirement of certificate qualifying me to conduct Roberta® workshops and trainings Europe-wide.

Teaching Experience

02/2014 - 05/2014 **Third year computing course in C**
Tutor, School of Physics, University of Bristol

09/2013 - 12/2013 **Nuclear and particle physics**
Teaching assistant, School of Physics, University of Bristol

10/2011 - 03/2012 **Programming for everybody - an introduction into JAVA**
Tutor, 9. Institute for Computer Science, RWTH Aachen

07/2009 - 09/2009 **Practical course in physics**
Laboratory demonstrator, I. Physics Institute B, RWTH Aachen

10/2008 - 03/2009 **Theoretical Electrodynamics**
Tutor, Institute for theoretical solid state physics (Theory C), RWTH Aachen

04/2008 - 09/2008 **Practical course in physics for students with physics as subsidiary subject**
Tutor, I. Physics Institute A, RWTH Aachen

10/2007 - 03/2008 **Programming for everybody - an introduction into JAVA**
Tutor, 9. Institute for Computer Science, RWTH Aachen

Community Outreach

2014 - 2015 **Bristol Bright Night**
Organisation and execution of interactive and hands-on showcasing of cutting edge research for over 1000 people.

2013 - 2015 **Particle Physics Masterclass**
Organisation and execution of several masterclasses in particle physics of the University of Bristol for high-school and A-level students.

2008 - 2013 **Workshop leader for Roberta® courses**
Planning, organisation and execution of workshops to instil young girls into the handling of modern technologies, awake interest in innovative developments in computer science and provide confidence in their technical skills.

2-4/12/2011 **MINT 400 in Berlin**

Organisation and realisation of the 5th MINT (Mathematics, Informatics, Natural science, Technology) event, amongst others as exhibition supervisor and workshop leader. The MINT event is a three day seminar for 400 pupils from 147 schools to gain close insight into the MINT working fields and to illustrate the importance of the MINT subjects for our society.

2010/ 2011 **Girlsday RWTH Aachen**

Organisation and realisation of the annual RWTH Aachen Girlsday.

Skills

Language skills Fluent in German, English and French

Computing skills C++, ROOT, RooFit, python, MINT, JAVA, Geant4 and LHCb software

Research Projects

09/2013 - present

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Proper title

Ph.D. thesis

with Dr. J. Rademacker at the University of Bristol

Measurement of the fractional CP-even content $F_+^{4\pi}$ of the self-conjugate decay $D^0 \to \pi^+\pi^-\pi^+\pi^-$ using Quantum-correlated $\psi(3770) \to DD$ decays collected by the CLEO-c experiment. The $D \to K_S\pi^+\pi^-$ and $D \to K_L\pi^+\pi^-$ decays were used to tag the signal mode and their binned strong-phase difference used to determine $F_+^{4\pi}$.

Ongoing model-independent measurement of the CKM angle γ at LHCb using $B^\pm \to D(\to \pi^+\pi^-\pi^+\pi^-)K^\pm$ decays. The γ angle is fitted for different bins in the $D \to \pi^+\pi^-\pi^+\pi^-$ phase-space simultaneously.

Implementation of the RICH alignment into the real-time alignment framework of LHCb for Run II.

06/2012 - 06/2013

Analysis of the $B_d \to K^{*0}e^+e^-$ decay at LHCb

Master's thesis

with Dr. M.H. Schune at the Laboratoire de l'Accelérateur Linéaire, Paris

Analysis of the $B_d \to K^{*0}e^+e^-$ decay channel which is particularly sensitive to effects of physics "Beyond the Standard Model" by measuring the polarisation of the virtual photon. Evaluating the reconstruction of the soft final state electrons, and optimisation of signal selection procedure using e.g. multivariate analysis tools and determination of signal yields in the 2011 and 2012 LHCb data.

05/2011 - 07/2011

Study on the measurement of the CKM angle γ at LHCb using untagged $B_s \to D^0\phi$ events

Internship

with Dr. M.H. Schune at the Laboratoire de l'Accelérateur Linéaire, Paris

Optimisation of the selection procedure for the $B_s \to D^0\phi$ decay using both simulation and data. Selection applied to 135 pb^{-1} 2010/ 2011 data collected by LHCb. No evidence of a signal could be found with this level of statistics.

07/2011 - 09/2011

Parametrisation of rigid body dynamics in quaternions

Bachelor's thesis

with Prof. R. Schmitz at the Institute for theoretical solid state physics (Theory C), RWTH Aachen

Study using abstract algebra, quaternion mathematics and rigid body dynamics to evaluate a novel parametrisation of the equations of motion of a rigid body. Deriving the kinematic quantities using quaternions and expressing the Euler equations of rigid body dynamics in quaternion form.

04/2008 - 08/2008

Hardware close programming and calibration of a Charge to Digital Converter (QDC)

Undergraduate project - beyond the standard curriculum

with Prof. A. Stahl at the III. Physics Institute B, RWTH Aachen

Selected for participation in the radiation therapy research project of the III. Physics Institute B.