Xavier Y. J. ROUBY

Curriculum Vitae

PERSONAL: Date and place of birth: May 20, 1980 in Charleroi, Belgium
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Title: Dr

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LAST POSITION: **Postdoctoral Research Associate**, Universität Freiburg (BMBF).
(October 2008 – August 2009) *Group leader: K. Jakobs*
ATLAS experiment.

EDUCATION:

- **Doctorat en Sciences (Ph. D.)**
(September 2003 – September 2008) *Supervisor: K. Piotrzkowski (UCL)*
Title: Measurements of photon induced processes in CMS and forward proton detection at the LHC.

- **Diplôme d'Etudes Approfondies en Sciences Physiques (Master)**
(September 2002 – September 2003) *Supervisor: K. Piotrzkowski (UCL)*
Title: Etudes préliminaires à la fabrication de prototypes de pots romains pour la physique des interactions entre deux photons à CMS.

- **Licence en Sciences Physiques**
(September 1998 – June 2002) *Supervisor: V. Lemaître (UCL)*
Title: Caractérisation des circuits hybrides et des modules de détection pour le trajectoraphe de CMS.

AWARD: One of the three Scientific Prizes 2003 of the Belgian Physical Society for the best master's thesis.

TRAINING:

- Experimental work on ZEUS' 6m tagger, DESY, Hamburg
  (4 weeks, August 2003) *Supervisor: K. Piotrzkowski (UCL)*
- Summer Student at Imperial College, London
  (5 weeks, July 2003) *Supervisor: C. Foudas (IC)*
- CERN Summer Student, Geneva
  (9 weeks, July- August 2001) *Supervisor: P. G. Verdini (CERN)*
- 4th ESA Student Parabolic Flight Campaign, Bordeaux
  (1 week, July 2001) *Supervisor: J. Govaerts (UCL)*

WORK EXPERIENCE:

Teaching assistant
Physikalisches Institut (Uni-Freiburg)
Supervision of advanced laboratory sessions for undergraduate students (3 modules of 5 days). Electron diffraction, Angle correlation (in German). Supervision of two new PhD students (M. Werner ; E. Schmidt).

Département de Physique (UCL)
with more than 1200 hours of teaching, from September 2002 to June 2008. Supervision of laboratory and exercise sessions for undergraduate students (200 h/year). Classical mechanics, Electromagnetism, Biomechanics, C++ programming, Introduction to Particle Physics.

LANGUAGES:

French (mother tongue) / English (proficient user)

German (basic user) / Dutch (basic user)

SKILLS AND COMPETENCES:

– social: Work experience in various team projects, ranging from 2 to 8 persons. Member of CERN RD39 and CMS collaborations, in particular in the CMS Forward Physics Group, and as a representative to the Trigger Study Group (CERN L3 Coordinator). Member of the ATLFastII collaboration.

– organisational: Organisation of CP3 lunch seminars (25 per year) (September 2006 – June 2008). Participation to multiple physics outreach events since September 2000. Administrator of a student astronomy club (September 2000 – June 2002).

– technical: Practical knowledge in silicon detector assembly. Interfacing detector read-out electronics in LabView.

– computer: C/C++/ROOT & support tools (make, CVS, SVN, doxygen, valgrind), National Instrument LabView, autoCAD (basics), Borland Pascal. (X)HTML and CSS. User and administrator of systems on Linux and Microsoft Windows ; hardware ; teaching assistant in C++.

– artistic: Pianist – Drummer – Photographer.

OTHERS: Holder of a Belgian driving license, category B vehicle.

RESEARCH ACTIVITIES

2008 – 2009 **Simulation of the ATLAS calorimeter: software developments**
Contribution to the FastCaloSim and ATLFast II project, related to the fast simulation of the ATLAS calorimeters. Official package in the ATLAS sofware.

2008 – 2009 **Simulation of a generic collider experiment: software developments**
Design, development and validation with S. Ovyn, of DELPHES, a fast simulator for a generic collider experiment, in particular at LHC. The DELPHES framework includes the simulation of usual detector components (tracker, calorimeters, muon system) as well as very forward detectors, using HECTOR. A simple trigger layer is also implemented. It relies on third party software for jet reconstruction (FastJet) and event display (FROG).

2007 – 2008 **Trigger activities for CMS Forward Physics: software developments**
Contributions to the development of new trigger paths (L1+HLT) for the Forward Physics Group, in particular for the production of exclusive dielectrons, dijets, electron-jet-gap and forward jets with rapidity gaps in between. Work with S. Ovyn and J.J. Hollar. These triggers have been integrated in the CMS software before the massive MC production (CSA07).

Related experience: CERN L3 coordinator, as a representative of the Forward Physics Group to the Trigger Study Group (position shared with S. Ovyn), Sept 2007 – June 2008. Part of the Ph.D. Thesis.

2006 – 2008 **Photon induced physics at LHC: phenomenology and analysis**
Contributions to Louvain photon group activities (UCL CP3) in photon-photon and photon-proton related research. Particular interests in the production of exclusive dielectrons and dimuons (including the muonic decay of photoproduced Upsilon mesons). Participation to the corresponding $\gamma\gamma \to \mu\mu$, $\gamma\gamma \to \Upsilon \to \mu\mu$, $\gamma\gamma \to ee$ analysis for the CMS Forward Physics group, with its application to early LHC data observation, luminosity calibration and forward detector alignment. This analysis has been approved by the CMS collaboration. Part of the Ph.D. Thesis.

2005 – 2007 **Simulation of particle transport in beam lines: software development**
Design, development and validation with J. de Favereau, of HECTOR, a fast simulator for the transport of particles in beam lines, in particular at LHC. HECTOR has become a major piece for the simulation and the integration of detectors like FP420 and ZDC into CMS software. HECTOR is also being evaluated in RHIC and in UCL cyclotron. Joining the CMS Forward Physics group. Participation to FP420 meetings, and several international workshops (*From Hera-to-LHC* in DESY, *low-x* in Tevatron, *Diffraction and forward physics* in Antwerpen). Part of the Ph.D. Thesis.

RESEARCH ACTIVITIES

2003 – 2006 **Research and development in Si edgeless microstrip detectors and cryogenic Si detectors**

Participation with O. Militaru to CERN RD39 collaboration R&D program on cryogenic Si detector developments and possible application to edgeless microstrip detector designs. Evaluation of the laser and plasma dicing of usal CMS tracker Si microstrip sensors as a technique for easy fabrication of resistant, efficient and practically edgeless detectors, operated at low temperatures.

Master dissertation: *Etudes préliminaires à la fabrication de prototypes de pots romains pour la physique des interactions entre deux photons à CMS.* (September 2004)

Multiple attendances and presentations to international workshops (RD39 meetings, ATLAS updates for SLHC) and to conferences (RD05, RESMDD06).
Also part of the Ph.D. thesis.

2002 – 2003 **Contributions to the CMS Si tracker construction: hardware qualification and assembly**

Development of the user interface for the FHIT system (CMS tracker Front-end Hybrid Industrial Tester), aiming at testing the quality of the tracker front-end hybrid production. The FHIT system was deployed in industry (Hybrid S.A.), in the IReS laboratory and at CERN, corresponding to the various stages of production, quality control and reception of the hybrids. Permanent contact with the different users and the tracker community. Data from FHIT provided the collaboration with the first statistical characterization of the tracker acquisition electronics. Subsequent participation to the installation of hybrid and module testing setups at the UCL.

Diploma thesis: *Caractérisation des circuits hybrides et des modules de détection pour le trajectographe de CMS.* (June 2003)

Award: one of the three Scientific Prizes 2003 of the Belgian Physical Society for the best master's thesis

Related experience: multiple short term working periods in Aachen III (Aachen, Germany), IReS (Strasbourg, France) and at CERN for the development, the installation and the maintenance of the systems. Training period of 5 weeks in Imperial College (London, UK).

LIST OF MAJOR PUBLICATIONS

S. Ovyn, X. Rouby, V. Lemaitre, *Delphes, a framework for fast simulation of a generic collider experiment*, **arXiv:0903.2225** [hep-ph] (CP3-09-01).

X. Rouby, K. Piotrzkowski, *Luminosity determination by CMS using exclusive muon pairs with early data*, **CMS AN-2008/061** (CP3-08-37).

J. de Favereau et al., *High energy photon interactions at the LHC*, **arXiv:0908.2020** [hep-ph] Submitted to EPJ (CP3-08-04).

J. Hollar, S. Ovyn, X. Rouby, *Exclusive $\gamma\gamma \rightarrow l^+ l^-$ production*, **CMS AN-2007/032**, **CMS PAS DIF-07-001** (CP3-07-28).

X. Rouby, J. de Favereau, K. Piotrzkowski, *HECTOR, a fast simulator for the transport of particles in beamlines*, **JINST 2 P09005**, arXiv:0707.1198v2 [physics.acc-ph] (CP3-07-13).

X. Rouby et al, *Recent developments of CERN RD39 Cryogenic Tracking detectors Collaboration*, Proceedings of the 6th International Conference on Radiation Effects on Semiconductor Materials Detectors and Devices (Oct. 2006) Florence, **NIM A 583** (2007)99-103 (CP3-07-11).

X. Rouby et al., *Cryogenic detector modules and edgeless silicon sensors*, Proceedings of the 7th International Conference on Large Scale Applications and Radiation Hardness of Semiconductor Detectors (Oct 2005), **NIM A 570** (2007) 308-311 (CP3-06-17).

SCHOOLS AND TRAINING PERIODS

15/11/2003 *2 weeks* **Joint Belgian-Dutch-German Summer School of Particle Physics**, Bonn (Germany).

04/08/2003 *4 weeks* **Technical training**, Dismantling and cleaning of the 6-m tagger, a QW sampling calorimeter for luminosity monitoring in ZEUS experiment, DESY, Hamburg (Germany).
Supervisor: K. Piotrzkowski (UCL)

30/06/2003 *5 weeks* **Summer Student at Imperial College**, London, (United Kingdom). Understanding APV25 and Beetle chips, the CMS tracker final FED and XDAQ software. *Supervisor: C. Foudas (IC)*

16/09/2002 *2 weeks* **Joint Belgian-Dutch-German Summer School of Particle Physics**, Nijmegen (Netherlands) .

15/07/2001 *1 week* **ESA 4th Student Parabolic Flight Campaign** (3 months of preparation + 1 week in Bordeaux, France). *EQUIMASS* experiment using the Sagnac effect as a probe to discrepancies in the equivalence principle.
Supervisor: J. Govaers (UCL)

02/07/2001 *9 weeks* **CERN Summer Student**, Geneva (Switzerland). Software developments for interfacing an USB controller to CMS tracker hybrids.
Supervisor: P. G. Verdini (CERN)

ORGANISATIONAL RESPONSIBILITIES

2007 – 2008 **CERN L3 coordinator**
Representative of the CMS Forward Physics Group (PAG) to the CMS Trigger Study Group, CERN. This position is shared with S. Ovyn. From Septembre 2007 to June 2008.

2006 – 2008 **CP3 lunch seminar chairman**
These weekly internal seminars, during the academic semesters, are meant for the presentation of the work of PhD students, post-docs or any members of the Center for Particle Physics and Phenomenology (CP3), UCL. From Septembre 2006 to June 2008.

2005 – 2006 **Co-organizer of the "journée des rhétos" for the Physics Department**
1-Day event for secondary schools with talks, didactic experiments and laboratory visits. Once per year, UCL.

2001 – 2002 **Vice-president (2001) and president (2002) of the Kot Astro**
Astronomy club for students on Louvain-la-Neuve campus. Multiple conference organisation and 1-week exhibition on the Solar System (2001) and Mars (2002), UCL.

TALKS ON BEHALF OF A COLLABORATION

24/04/2008 *Tagging photon interactions at the LHC*
on behalf of the Louvain CP3 photon group,
Workshop on High energy photon collisions at the LHC, CERN (Switzerland).

13/03/2008 *Forward Physics at the LHC*
on behalf of the CMS and ATLAS collaborations,
XLIIIth Rencontres de Moriond, QCD session, La Thuile (Italy).

25/10/2007 *High energy photoproduction and photon-photon interactions at the LHC*
on behalf of the Louvain CP3 photon group,
Meeting on Diffraction and Forward Physics at HERA and LHC, Antwerpen (Belgium).

11/10/2006 *Recent developments of CERN RD39 Cryogenic Tracking Detector Collaboration*
on behalf of the RD39 collaboration,
RESMDD Conference, Florence (Italy).

06/10/2005 *R&D for cryogenic detector modules by the CERN RD39 Collaboration*
on behalf of the RD39 collaboration
RD05 Conference, Florence (Italy).

OUTREACH ACTIVITIES

2006 – 2008 **Cycle d'initiation à la physique quantique, Samedis de la Physique**
- (1st year) 2 lectures on Detector Technologies (January 2006)
- (2nd year) 1 lecture on Accelerator Principles (May 2007)
- (3rd year) 3 lectures on Physical Analysis and LHC Technologies (May 2008)

Université libre de Bruxelles (ULB), Brussels (Belgium).
Audience level: retired engineers and scientists.

2005 – 2008 **Masterclasses in Particle Physics**
Multiple experimental presentations and visits (twice a year, since 2005)
UCL, Louvain-la-Neuve (Belgium).
Audience level: secondary schools.

22/09/2006 **La nuit des chercheurs**
The EQUIMASS experiment: a test of the principle of equivalence (September 2006)
UCL, Louvain-la-Neuve (Belgium).
Audience level: families.

2003 – 2004 **Festival des Sciences – Printemps des Sciences**
The EQUIMASS experiment: a test of the principle of equivalence
UCL, Louvain-la-Neuve (Belgium).
Audience level: secondary schools.

TEACHING ACTIVITIES:

2009 **Teaching Assistant, Physikalisches Institut, Universität Freiburg**

Elektronenbeugung & Winkelkorrelation (FPII): Laboratory session (3 weeks)
Supervision of 1-week laboratory sessions, in German.
Audience: undergraduate students in Physics
Professors: K. Jakobs – C. Weiser – J. Dingfelder.

2002 – 2008 **Teaching Assistant, Département de Physique, Université catholique de Louvain**

Mécanique et biomécanique (IEPR1005): Exercise sessions [409 h]
Introduction to classical mechanics and applications to the human body.
Audience: undergraduate students in Kinesitherapy and Sport Sciences (BAC1)
Professors: André Fayt – Pierre Defrance – Patrick Willems.

Physique générale I (PHY1113- PHYS1110): Exercice and laboratory sessions [144h]
Introduction to classical mechanics.
Audience: undergraduate students in Chemistry, Biology and Geography (BAC1)
Professor: Jacques Lega.

Physique générale II (BIR1210): Laboratory sessions [528 h]
Classical electromagnetism, wave mechanics, optics and spectroscopy.
Audience: undergraduate students in bio-engineering (BAC2)
Professors: René Prieels – Pierre Defrance – Philippe Antoine.

Informatique et Méthodes Numériques (PHY1271): Exercise sessions [116 h]
Introduction to C++.
Audience: undergraduate students in Physics (BAC2)
Professor: Giacomo Bruno.

Introduction à la physique des particules (PHYS2263d): Exercice sessions [20 h]
Introduction to particle physics.
Audience: undergraduate students in Physics (BAC3)
Professor: Vincent Lemaître.

Détection et mesure des radiations ionisantes (RPR2300): Laboratory sessions [18h]
Introduction to standard radiation detectors.
Audience: undergraduate students in Physics (BAC3)
Professors: Jean-Pierre Meulders – Thierry Delbar.

MANUSCRIPT REVIEW

2008 Abstracts for the Session on Radiation Damage Effects for the 2008 Nuclear Science Symposium, 2008 IEEE NSS Dresden, 19 - 25 October 2008.

FULL PUBLICATION LIST

2009 J. de Favereau et al., *High energy photon interactions at the LHC*, **arXiv:0908.2020** [hep-ph] Submitted to EPJ (CP3-08-04).

W. Adam et al., *Alignment of the CMS Silicon Strip Tracker during stand-alone Commissioning*, 2009, **JINST 4 T07001**.

J. Härkönen et al., *Development of cryogenic tracking detectors for very high luminosity experiments*, 2009, **NIM A 607** (2009)41-44.

W. Adam et al., *Performance studies of the CMS Strip Tracker before installation*, 2009, **JINST 4 P06009**.

CMS Tracker Collaboration, *Reception Test of Petals for the End Cap TEC+ of the CMS Silicon Strip Tracker*, **CMS NOTE-2009/005**, 22p**.**

CMS Tracker Collaboration, *Track Reconstruction with Cosmic Ray Data at the Tracker Integration Facility*, **CMS NOTE-2009/003**, 38p**.**

CMS Tracker Collaboration, *CMS Tracker Alignment at the Integration Facility*, **CMS NOTE-2009/002**, 36p.

S. Ovyn, X. Rouby, *Delphes, a framework for fast simulation of a generic collider experiment*, arXiv:0903.2225v1 [hep-ph], 29p (CP3-09-01).

2008 P. Azzi et al., *Silicon Strip Tracker Detector Performance with Cosmic Ray Data at the Tracker Integration Facility,* **CMS NOTE-2008/032**, 44p.

J.C. Fontaine et al., *Petal Integration for the CMS Tracker End Caps*, **CMS NOTE-2008/028**,30p.

X. Rouby, *Measurements of photon induced processes in CMS and forward proton detection at*

2008 P. Azzi et al., *Silicon Strip Tracker Detector Performance with Cosmic Ray Data at the Tracker Integration Facility,* **CMS NOTE-2008/032**, 44p.

the LHC, Sept. 26 (2008), **UCL thesis 135-2008**, 208p.

S. Chatrchyan et al., *The CMS experiment at the CERN LHC*, 2008, **JINST 3 S08004,** 361p.

X. Rouby, K. Piotrzkowski, *Luminosity determination by CMS using exclusive muon pairs with early data*, **CMS AN 2008/061** (CP3-08-37), 12p.

W. Adam et al., *The CMS tracker operation and performance at the Magnet Test and Cosmic Challenge*, 2008, **JINST 3 P07006**.

X. Rouby, *Tagging photon interactions at the LHC*, arXiv 0806.4941 [hep-ex], (CP3-08-27), **Nuclear Physics B** (Proc. Suppl.) **179–180** (2008) 202–210.
Proceedings of the CERN workshop on high energy photon interactions.

M.G. Albrow et al., *The FP420 R&D Project: Higgs and New Physics with forward protons at the LHC*, arXiv:0806.0302v1 [hep-ex], 176p.

J. de Favereau et al., *High energy photon interactions at the LHC*, arXiv:0908.2020 [hep-ph] Submitted to EPJ (CP3-08-04), 12p.

X. Rouby, *Forward Physics at the LHC*, Proceedings of the XLIIIth Rencontres de Moriond, QCD Session, La Thuile, **CMS CR-2008/020**, arXiv:0805.4406 [hep-ex], (CP3-08-11), 6p.

S. Ovyn, X. Rouby, J.J. Hollar, *Forward Physics Triggers*, **CMS IN-2008/028**, (CP3-08-07), 8p.

2007 J. Haerkoenen, Z. Li et al., *RD39 Status report*, **CERN-LHCC-2007-028**. (Nov 2007) 30p.

J. Hollar, S. Ovyn, X. Rouby, *Exclusive $\gamma\gamma \rightarrow l^+ l^-$ production*, **CMS AN-2007/032**, **CMS PAS DIF-07-001** (CP3-07-28), 25p.

X. Rouby, J. de Favereau, K. Piotrzkowski, *HECTOR, a fast simulator for the transport of particles in beamlines*, **JINST 2 P09005**, arXiv:0707.1198v2 [physics.acc-ph] (CP3-07-13), 31p.

X. Rouby et al, *Recent developments of CERN RD39 Cryogenic Tracking detectors Collaboration*, Proceedings of the 6th International Conference on Radiation Effects on Semiconductor Materials Detectors and Devices (Oct. 2006) Florence, **NIM A 583** (2007)99-103 (CP3-07-11).

Z. Li et al., *Cryogenic Si detectors for ultra radiation hardness in SLHC environment*, **NIM A 579** (2007) 775-781.

Z. Li et al., *Development of cryogenic Si detectors by CERN RD39 Collaboration for ultra radiation hardness in SLHC environment*, Proceedings of the 10th Pisa Meeting on Advanced Detectors : **NIM A 572** (2007) 305-310.

The CMS Collaboration, *CMS expression of interest in the SLHC*, **CERN-LHCC-2007-014**, **CERN-LHCC-G-131.**

The CMS Collaboration, *CMS physics technical design report: Addendum on high density QCD with heavy ions*, **CERN-LHCC-2007-009**, **J. Phys.G34** (2007) 2307-2455.

2006 J. Haerkoenen, Z. Li et al., *RD39 Status report*, **CERN-LHCC-2006-034** (Nov 2006), 35p.

M. Albrow et al., The CMS and TOTEM diffractive and forward physics working group, *Prospects for Diffractive and Forward Physics at the LHC*, **CERN/LHCC 2006-039/G-**124, 157p.

The CMS Collaboration, *CMS technical design report, volume II: Physics performance*, **CERN-LHCC-2006-021**, **CMS-TDR-008-2**, **J.Phys.G34:**995-1579, 2007.

The CMS Collaboration, *CMS physics: Technical design report*, **CERN-LHCC-2006-001**, **CMS-TDR-008-**1, 547p.

2005

R. Brauer et al., *Design and test beam performance of substructures of the CMS tracker end caps*, CERN **CMS-NOTE-2005-025 (**Dec 2005) 45pp.

X. Rouby et al., *Cryogenic detector modules and edgeless silicon sensors*, Proceedings of the 7th International Conference on Large Scale Applications and Radiation Hardness of Semiconductor Detectors (Oct 2005), **NIM A 570** (2007) 308-311 (CP3-06-17).

O. Militaru et al. ,*Cryogenic operation of edge-sensitive silicon microstrip detectors*, Proceedings of the 9th conference "Astroparticle, Particle and Space Physics, Detectors and Medical Physics Application", (Oct 2005) 4p.

W. Adam et al., *The effect of highly ionising particles on the CMS silicon strip tracker*, **NIM A 543** (2005) 463-482.

2004 and before

J. Haerkoenen et al., *Recent results from the CERN RD39 Collaboration on super-radiation hard cryogenic silicon detectors for LHC and LHC upgrade*, **NIM A 535** (2004) 384-388.

J. Haerkoenen, Z. Li et al., RD39 Status report, **CERN-LHCC-2004-034** (Nov 2004) 34p.

T.O. Niinikoski et al., Low temperature tracking detector, **NIM A 520** (2004) 87–92.

P. Luukka et al., *Quality testing of silicon detector modules*, Proceedings of the XXXVIII Annual Conference of the Finnish Physical Society (March 18-20, 2004, Oulu, Finland).

K. Borer, T. O. Niinikoski, Z. Li et al., *RD39 Status Report*, **CERN-LHCC-2003-060** (Nov 2003) 28p.

X. Rouby, *Etudes préliminaires à la fabrication de prototypes de pots romains pour la physique des interactions entre deux photons à CMS*, Master thesis, unpublished, September 2003, 45p.

X. Rouby, *Testing and characterizing CMS tracker front-end hybrids*, **Physicalia Magazine**, 25-3 (2003) 149-158.

X. Rouby, *Caractérisation des circuits hybrides et des modules de détection pour le trajectoraphe de CMS*, Diploma Thesis, unpublished, June 2002, 108p.