

Albert De Roeck CV

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Key Dates

- 1960: Year of Birth, Belgium
- 1982: Completed physics studies at the University of Antwerp, “with highest distinction”
- 1982: PhD student/postdoc position for the NA22/NA27’/H1 experiments at the Antwerp University
- 1988: Completed PhD on data analysis of the NA22 experiment (CERN)
- 1990: MPI Munich tenure track position for the H1 experiment
- 1992: DESY staff physicist, for the H1 experiment
- 1995: 5 yearly award of the Belgian University Foundation for young Belgian Alumni scientists, for their international recognition
- 1998: Sabbatical at CERN, in the OPAL experiment
- 1999: CERN staff physicist, in CMS and OPAL
- 2010: Doctor Honoris Causa at the University of Helsinki

Short Summary

My high energy physics career started in fixed target hadron scattering experiments at CERN, namely the NA22 and NA27’ experiments. Both experiments studied multi-particle production dynamics in proton-proton and meson-proton interactions with a hybrid detector, which was a combination of a high performance bubble chamber and an electronic spectrometer. Within that experiment I had a number of key responsibilities, such as for the trigger and for aspects of the reconstruction and calibration. I was also co-editor for roughly 10 physics papers, mostly involving my own analyses.

In 1989 I moved my interest to HERA and in particular to the H1 experiment, first for the MPI Munich group, led by Horst Oberlack, and later as a DESY staff member, in the group of Franz Eisele. During the period for MPI I was involved in the installation and testing of the Liquid Argon Calorimeter, the heart of the H1 experiment, and in the development of the Liquid Argon Trigger. When I became DESY staff, I took over the software and computing coordination for H1, to prepare for the first collisions, which were only a year away at that point. The changes I introduced (such as moving away from the IBM main frame) were successful and H1 was able to reconstruct efficiently and fast its data, so that we had an excellent turn around for physics and first papers already in 1992. As a token of confidence I was asked by the collaboration to become the (first) physics coordinator of the experiment, initially for the analysis of the upcoming 1993 and 1994 data. I continued physics coordinator till 1996, the last years accompanied by a second physics coordinator. Among other things we made the first precise measurements structure of the proton for a very large Bjorken- x range, and since then I have kept connected to proton structure questions.

In 1998 I took a full year leave of absence to work for LEP at CERN, where the Higgs hunt was starting in its earnest. I also had a specific plan for making certain QCD measurements at CERN: At HERA there was some doubt on whether we were observing so called small $\log-x$ effects in the data. With theorist we had speculated that in fact LEP could be an ideal place to confirm this, namely in $\gamma^*\gamma^*$ collisions, so I decided to go out and try to measure the effect. We published the result with OPAL in 1999. While being in the OPAL experiment I also got involved in searches for new physics and other topics. Rolf Heuer was the spokesperson of OPAL, and I continued to work with him afterwards on Linear Colliders.

In 1999, after almost 10 years in Germany, I took up a CERN staff position, as I had concluded that my future would be in LHC physics. I could choose to join any of the experiments, but it was clear pretty fast that the CMS detector concept was the most attractive one. In CMS I took several key roles over the years, such as CMS simulation coordinator (2000-2004), physics simulation and reconstruction convener (2004-2006), MTCC offline/computing/analysis coordinator (2006), exotica convener (2008-2009) and now deputy spokesperson. In 2007 we published the physics TDR J.Phys.G., and it is so far the most referenced CMS paper with over 500 citations.

As a spin off, for ideas for CMS, I have also been driving the study of the so-called exclusive Higgs production, ie a final state that consists only of a Higgs particle and two protons. We launched –together with ATLAS and others – an R&D effort for the study of near beam detectors. This detector study was published in JINST 4:T10001, 2009 and has over a 100 citations so far.

More details on my CV are schematically given below.

Detailed Description

CERN: NA22 EHS experiment: hadron-hadron scattering at 250 GeV/c:

- Trigger simulations, used to define triggers for the data taking
- EHS spectrometer: efficiency and track reconstruction coordinator for the experiment
- EHS spectrometer operation leader during data taking
- Responsible in the Belgian lab for the organization of the scanning and measuring of the BC film
- Editor of ~ 10 papers on physics analysis during '85-'92

CERN: NA27' EHS experiment: hadron-hadron scattering at 360 GeV/c:

- Data and Monte Carlo reconstruction production coordinator of the experiment
- Editor of ~ 2 papers on physics analysis during '88-'92

DESY: H1 experiment: electron-proton scattering at HERA (1988-2000):

- Liquid argon calorimeter installation and commissioning
- Trigger simulation study group coordinator
- Structure function physics group coordinator (eg. for the first F_2 analyses, showing the unexpected rise at small x: Nucl.Phys.B407 515,1993; 392 citations.)
- General software and computing coordinator (for 2 years, just before and during start-up)
- General physics coordinator (for the first H1 papers; 67 papers published during that period)
- Editor of ~ 12 papers on physics analysis, including new ideas on
 - Diffractive phenomena measurements
 - Low-x measurements with forward jets
 - F_2 scaling studies and gluon determination

CERN: OPAL experiment: e+e- scattering (1998-):

- QCD and two-photon physics studies
- Editor of 4 physics papers including new studies on low-x phenomena in e+e-, Bose-Einstein in WW events, and on the photon structure

CERN: CMS experiment: pp scattering at 7-14 TeV (2000-)

- Simulation coordinator (till end 2004): completion and deployment the Geant4 based full simulation of the CMS detector; start of the fast simulation project
- High Level Trigger (HLT) Technical Design Report chapter editor and editor of the related HLT publication: Eur. Phys. J. C46 (2006) 605
- Physics reconstruction and simulation coordinator of CMS (2005-2006). Editor of the Physics TDR Vol II which was published in J. Phys. G 34 (2007) 995 (> 500 pages, > 500 citations)
- Magnet Test and Cosmic Challenge (MTCC) software and computing coordinator (2006-2007).
- Deputy CERN physics group leader (2004-2007)
- Convenor of the CMS missing ET subgroup (2007):
- Convenor of the CMS Exotica group (2008-2009): About 40 analysis in preparation for first data; 15 papers completed for releasing MC results to public in the summer '09.
 - Editor of 4 papers on searches at the LHC during that period (extra dimensions, unparticles)
- ARC chair or co-editor of several of the 2010 data papers
- **CMS Experiment Deputy spokesperson as of 1/1/2010 for 2 years**

FP420 Project: detecting forward protons at the LHC with near beam detectors

- Co-author of the initial paper that triggered the project; Eur.Phys.J.C25 391 2002, cited 134 times
- Co-founder of the FP420 R&D effort across LHC experiments (CMS, ATLAS, TOTEM) pursuing novel detector methods to measure the scattered protons.
- Co-spokesman of the FP420 effort (2004-2009)
- Editor of the FP420 R&D summary paper (180 pages), (arXiv:0806.0302; JINST 4:T10001,2009.)

Other activities

- Co-organizer of ~ 20 workshops since 1995 (physics, statistics, future accelerators studies...)
- Committee member of: plenary ECFA, EIC-board, FWO (Belgium), SPSC (1998-2002) ...)
- Editorial board member of J.Phys G.

Present positions

- CERN senior research Scientists
- Part time Professor at the University of Antwerp (Belgium)
- Visiting Professor at the University of Durham (UK)
- Adjunct Professor at the University of UC-Davis (US)

Spire lists 690 papers, including several review papers, which you can find via

<http://www.slac.stanford.edu/spires/find/hep/www?rawcmd=find+a+a+de+roeck+&FORMAT=WWW&SEQUENCE=>