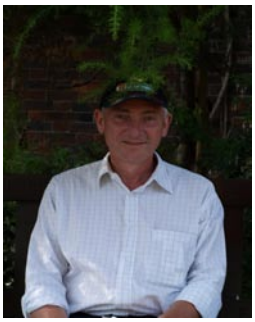

CV for Peter H. Hansen (long version)

Revised 17/11/2009

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email: phansen@nbi.dk
Birthday: 31/10/1951. Civil status: married, two children (22 and 18)

Research activities:

1970-77 *Studies in mathematics and physics at Univ. of Copenhagen.*

My master dissertation was about the first signs of jets in hadronic collisions from the British-Scandinavian ISR collaboration. I compared rates of identified high pT particles with predictions from two early models (Feynman-Fields and Brodsky et al.). The results were not generally considered decisive evidence for jets in hadronic collisions, although they did show an enhancement of high pT particles accompanying the trigger particle, but jet fragmentation issues have ever since then been a steady line of my research.

1977-80 *Post Doc at the University of Michigan.*

I measured spin effects in elastic pp scattering with professor Alan Krish [1]. To this day these results are puzzling. Amazingly, they are now among the basic justifications for a new pp and heavy ion collider being constructed at the Dubna laboratory in Russia.

1981-83 *Post Doc at the Niels Bohr Institute.*

I participated in constructing UA2 forward drift chambers. In particular, I was responsible for constructing the ground planes and for the cosmic ray and radioactive source testing of the assembled chambers.

1983-85 *Fellow at CERN.*

I was responsible for parts of the tracking code and for the calibration and alignment of forward chambers. The very first Z observed in the world, in 1982, had a perfect electron leg in the central region and another one in the forward chambers. This leg could unfortunately not be validated because it skirted a coil and started a shower. Later on, however, the chambers measured the momentum and charge from many electrons from W and Z decays [2].

I studied direct photons in UA2 using the pre-shower counter to statistically measure the number of single isolated photons and collaborated with theorists from Annecy to understand higher order corrections to QCD Compton scattering.

1985-86 *Post Doc at NBI.*

I published the study of direct photons in a PhD thesis and a UA2 paper [3], which, together with an update two years later, for almost a decade kept its position as the most precise measurement of high pT direct photons until Fermilab took over.

1986-90 *Assistant professor at the NBI.*

I wrote the off-line software for the luminosity calorimeter in the ALEPH experiment. The work on the luminosity continued for more than ten years until 2001. Each year I contributed the calibration and luminosity values for this sub-detector.

The early measurement of the number of light neutrinos [4] hinged on these luminosity values and was a great success for ALEPH. At LEP II it again became important [8], since the newer forward silicon calorimeter could not supply the absolute luminosity.

1990-99 *Associate professor at the NBI.*

I used a kinematic fit, designed by Bertram Rensch, for measuring neutral strange particles in ALEPH. This resulted in a publication on the rates of neutral strange particles and two-particle correlations in Z decays [5]. The results were used to tune the “Lund model”.

I also measured the polarization of hyperons from Z decay and compared the results with a “naïve” quark model based on the Lund model [6].

1999-2001 *Sabbatical at CERN.*

I measured the forward-backward asymmetry of b-quarks from Z decay using a neural network, designed by A. Halley and D. Armstrong, both for flavor and charge identification. I (maybe) pioneered a data driven multi-dimensional tag-probe method for the determination of the selection efficiency matrix for the different kinds of quarks. The resulting determination of the weak mixing angle is still to this day the most accurate single measurement after the SLAC polarization measurement [7], but, alas, the two do not agree, although they are both claimed to be statistics limited.

In this period I took many data taking shifts. In two of those, a Higgs candidate were recorded [9].

2001-2009 *Associate professor at the NBI.*

I studied alignment of the ATLAS TRT and joined the TRT test beam efforts. During the years 2002-2005 I was sole responsible for the TRT software regarding alignment, calibration and in general for the translation of raw data into calibrated drift-circles. Later, many of these tasks have gradually been taken over by younger forces in the TRT collaboration (we are now a dozen people on the job), but this activity is still my main responsibility. The natural continuation for me will be the analysis of vector bosons produced in ATLAS, especially those decaying into electrons.

I undertook in September 2009 to draft a paper (not yet published) on the TRT tracking performance as seen in the ATLAS combined test beam. It is here shown that by using all the information about the signal pulse in a TRT straw, a resolution of 0.117mm at 90% efficiency is

obtained and thus a significantly better stand-alone momentum resolution than expected. In this work, discussions with many people from the Inner Detector have been of great help, and especially the ideas of J. Dines Hansen and Troels Petersen have been invaluable.

In 2004 I searched for pentaquarks in ALEPH data. When I presented the negative result at the DIS workshop in the Slovak Republic in 2004, it was generally considered as the terminal blow to the preceding positive observations [10].

In this period I also contributed to two papers on two-dimensional Bose-Einstein correlations and on deuteron production in Z decays.

Research management activities:

1986-2005 *Board member in the Danish Physical Society*
My area of responsibility was subatomic physics.

1991 *Secretary for the big evaluation of Danish Physics.*
I assisted the international committee in the work that led to a dramatic series of fusions among Danish physics institutes.

1993-99 *Member of the Danish Natural Science Research Council.*
This implied participation in many government programs and committees and also participation in the detailed evaluation of day-to-day proposals from all of natural science. Among the programs that I am proud of having pushed on a national scale are the fiber optics efforts that have developed into a blooming industry, the biophysics and glaciology efforts that later have become major focus areas, the PLANC satellite and, of course, the LHC project. In general, I like to think that I may have contributed in directing more attention onto long term international efforts.

1994-1997 *The CERN LEP committee.*
We discussed possible upgrades and extensions of the LEP accelerator.

2007-2009 *Leader of Danish CERN activities.*
I was PI on the application to funds for Danish CERN activities for two periods, 2008-09 and 2010-11. Motivated by a severe budget cut in 2007, I have been leading the efforts to find alternative funding for particle physics. This has succeeded beyond the wildest dreams, as far as phenomenology and data analysis at the LHC is concerned with the new Discovery Center. My predecessor in this function, John Renner Hansen, has already built long term structures in the field of computing. The remaining job now to be done is to build up a Danish expertise with long term funding in detector and accelerator R&D.

2007-2009 *ECFA secretary*
A major work-load has been the job as ECFA secretary. Since particle physics in Europe enjoys the benefits of being very highly organized, this job is reasonably important. Three countries per year are visited and there are two other major meetings per year with talks about future directions of particle physics. In addition to recording all of this, it is my job to conduct accurate surveys on the state of European particle physics activities.

Educational activities:

Teaching has been a part of my work at all stages of my career. The courses I have taught range from undergraduate to PhD level in many

areas of physics. At the undergraduate level, I have in later years specialized in laboratory exercises and now run the exercises in quantum mechanics. At the PhD level, the latest course was a Nordic school in experimental particle physics in 2007 (the section on tracking software). At the master level, I run a yearly course on experimental techniques in collaboration with Stefania Xella.

I have supervised a large number of sub-bachelor, bachelor, master and PhD projects, the three latest being master projects on TRT commissioning with cosmic rays, on analysis opportunities regarding magnetic monopoles and regarding J/Psi particles, respectively.

Outreach activities:

I have been responsible for the “Cultural nights” over many years (talks and shows about all of physics), “H.C. Oersted days” for high school students and other similar arrangements.

I initiated the DUKS project for involving Danish high schools in cosmic rays. We came a long way, and many student projects have benefitted, but we have not yet reached the goal of this project. It will eventually be reached, but much slower than originally announced.

At the LHC start-up last year, there was an explosion of interest in the Danish media (as in all European media) and I gave many interviews and wrote many articles, as did my colleagues. It is well known that an accident happened a week later. Given the risks of public spin in this situation, it has been very comforting to witness that the public interest has actually deepened and broadened from the LHC machine itself to the science in question. The last two public lectures I gave, November 2009, were in fact on the philosophical foundations of science (as well as the background and perspectives of the LHC), because that was what the audience wanted to hear about.

2003-2009 *Physics Olympics*
I think this is important for reaching the most talented high school students. In the beginning I participated in all activities, but now concentrate on providing the experimental tests used in the selection process.

2000-2009 *Hands on Physics*
Each year we host an international event where high school students investigate collision events from CERN and afterwards discuss the results with other classes in Europe using EVO. We have started to copy this to similar events on the national level in order to increase the volume of high school students reached.

Awards: 1993 The Carlsberg Foundation silver medal.

Hobbies: I sing, everything from renaissance to present day classical music.

Ten significant Publications

1. E.A. Crosbie et al.,
   ``Energy Dependence Of Spin Spin Effects In P P Elastic Scattering At 90-Degrees Center-Of-Mass,''
   Phys. Rev. **D23**(1981) 600.

2. J.A. Appel et al. [UA2 Collaboration],
   ``Measurement of W+- and Z0 properties at the CERN anti-p p collider,''
   Z. Phys. C**30**, (1986) 1.

3. J.A. Appel et al. [UA2 Collaboration],
   ``Direct photon production at the CERN anti-p p collider,''
   Phys. Lett. B**176**,(1986) 239.

4. D. Decamp et al. [ALEPH Collaboration],
   “A precise determination of the number of families with light neutrinos and the Z boson partial widths,”
   Phys. Lett B**235,(**1990) 399.

5. D. Busculic et al. [ALEPH Collaboration],
   “Production of K0 and Lambda in hadronic Z decays”
   Z. Phys C**64,(**1994) 361.

6. D. Busculic et al. [ALEPH Collaboration],
   “Measurement of Lambda polarization from Z decays”
   Phys. Lett B**374,(**1996) 319.

7. A. Heister et al. [ALEPH Collaboration],
   “Measurement of AFB(b) using inclusive b-hadron decays”
   Eur. Phys. J. C**22,(**2001) 201.

8. A. Heister et al. [ALEPH Collaboration],
   “Measurement of W pair production in e+e- collisions at centre-of-mass energies from 183 GeV to 209 GeV”
   Eur. Phys. J. C**38,(**2004) 147.

9. R. Barate et al. [ALEPH Collaboration],
   “Observation of an excess in the search for the standard model Higgs boson at ALEPH”
   Phys. Lett. B**495,(**2000) 1.

10. S. Schael et al. [ALEPH Collaboration],
    “Search for pentaquark states in Z decays”
    Phys. Lett B**599,(**2004) 1.