CHARICLIA I. PETRIDOU

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ACADEMIC QUALIFICATIONS

- **Ph.D in Experimental Particle Physics**: Syracuse University, Syracuse N.Y, USA(1979-1983) Title: ***In Search for Narrow proton-antiproton Bound States: 'High Resolution Gamma and Charged Pion Spectra from Protonium.'*** (July 1983).
- **MSc in Physics**, Syracuse University, Syracuse N.Y, USA (1977-1979)
- **Undergraduate Education in Physics**, School of Mathematics and Physics, Aristotle University of Thessaloniki, Greece (1970 – 1974).
- During the years 1974-1977 worked as Research Assistant in the Nuclear Physics Lab of the Aristotle University of Thessaloniki

RESEARCH/PROFESSIONAL ACTIVITIES

Hadron Colliders-ATLAS Experiment at LHC (1994-today)

- Prof. in Physics (2008), Aristotle University of Thessaloniki, Team leader of the Thessaloniki Muon group of the ATLAS experiment at CERN (May 1995-today).
- Associate Prof. in Physics, Aristotle University of Thessaloniki (1995-2008)
- Corresponding Associate Sept-Dec 2009, June-Sept 2010: *B-Physics with the first data at LHC*
- Paid Scientific Associate, Experimental Physics Division, CERN, ATLAS Experiment. Responsible of the BIS chamber commissioning and installation in the ATLAS detector (Nov. 2003-Dec. 2004).
- Corresponding CERN Fellow, Experimental Physics Division, ATLAS Experiment **(**Jun1997-Sept. 1997)

Creation and operation in Thessaloniki of the Laboratory for the construction and test of particle Physics detectors. Construction and test of the BIS tracking chambers of the ATLAS Muon Spectrometer.
For information: www.physics.auth.gr/atlas
Standard Model and New Physics searches with muons.

Grid Technology

- Responsible of the CrossGrid project in AUTh (2001-2005).

Creation and operation of a GRID cluster at AUTh for applications in Particle Physics (2002-2005).

LEPI & LEPII-DELPHI Experiment (1992-2000)

- Senior Research Associate(A36), INFN Trieste, DELPHI Experiment, LEP(e+e- collider) (Jan. 1992-April 1995).
- Team Leader of the Thessaloniki DELPHI group in collaboration with INFN-Trieste (1995-2000).

b-physics studies, properties of the Z boson and W boson production and measurement at LEPII.
Search for anomalous Trilinear Gauge couplings at LEPII

Hadron Colliders-UA2 Experiment (1985-1992)

- CERN Fellow, UA2 Experiment,(SPS Collider) (1985 - 1988).
- Senior Research Associate (A36), I.N.F.N. Pisa / CERN, UA2 Experiment. (1988 – 1992).

Level1 trigger, online DAQ, optimization of the performance of the Jet Vertex Detector of UA2. Study of the properties of the W and Z bosons. Measurements of the Standard Model parameters of the electroweak and strong forces
In partcular responsible of the analysis on the search for anomalous gauge boson couplings in UA2. Active in the anlysis on tau identification and missing energy measurement.

Antiproton-deutron system (1978-1983)

- Research Associate Syracuse University, Syracuse, NY (July 1983 - March 1984).

Trigger, data acquisition, data analysis

Rare Kaon decays (1984-1985)

- Research Associate, Brookhaven National Laboratory, N.Y. (March 1984 - July 1985).

Development of a photon veto detector (BaF2 crystal read by low pressure drift chamber)

LEADERSHIP POSITIONS - OTHER RESPONSIBILITIES

- Scientific responsible of more than 20 research projects funded by national or European sources. Through these projects the Thessaloniki-ATLAS research group was funded by approximately 2 Meuro for a period of 10 years which included the building of the Laboratory for the construction of the Muon Chambers and the funding of graduate and undergraduate students and technicians.
- More than 50 Invited talks at International Conferences and seminars in various research centers.
- Organising Committee for international conferences and workshops in the scientific field of particle physics
- Supervisor of two PhD theses in ATLAS, the latest completed in 2008 and awarded a prize by the Muon ATLAS Collaboration. Also, supervisor of four Master theses in ATLAS (one led in an ATLAS publication) and over 30 diploma theses of undergraduate students. Currently Theses supervisor of four PhD students in ATLAS
- Responsible for the Microcosm CERN exhibition taken place at the International Fair of Thessaloniki and funded by the Organisation 'Thessaloniki, Cultural Capital 1997'
- Popular articles and talks on Particle Physics.
- Organization of the MasterClasses: Hands on Particle physics (2007 - 2009) (Attended in total by over 400 high school students of Northern Greece and their teachers).
- Member of the National Council of Research and Technology (NCRT), (Section: Physics, Chemistry and Materials), (Jan 2003-2009).
- Member of the Governing body of the Greek Physical Society for HEP (1995 –2003, 2008-2009).
- Member of the Greek-CERN Scientific Committee (1995 – today).
- National Representative of the 6th Framework Programme (2004-2006).
- Greek Representative of ACCU board for CERN users (2001 –2004).
- Division Leader of the Nuclear and Particle Physics Division, Univ. of Thessaloniki (Sept.1998 – Aug 1999).
- ATLAS Advisory Committee to the Collaboration Board (1999-2001).

RESEARCH EXPEDITIONS LED

- Co-convenor of the B-Physics Working group of ATLAS (Oct. 2008 – Sep. 2010). Leading the B-Physics group in ATLAS through the analysis of the first data at LHC and the first ATLAS publications on B-Physics.
- Coordinator of the analysis on Standard Model Physics in the ARTEMIS Marie-Curie RTN (2006-2010).
- Leader of the laboratory formed for the design, construction and test of the Barrel Inner Small (BIS) Muon chambers at the University of Thessaloniki. More than 40 people (undergraduate/graduate students, technicians and faculty), worked over a period of seven years for the timely and according to specifications completion of the project(1997-2004).

EDITORIAL BOARD MEMBERSHIPS

- Member of the ATLAS Publications Committee (Mar. 2008 – Feb. 2010)
- Chair /member of ATLAS editorial boards and referee of the ATLAS CSC book chapter: Exotics
- Reviewer of research proposals

SCIENTIFIC PUBLICATIONS / CITATIONS

Research in High Energy Physics (HEP) is performed in large international collaborations (ATLAS has ~3000 scientists). Before submitted to a journal, all publications are scrutinized in a collaboration wide review process. The concept of primary authorship is not applied in HEP. Besides the ATLAS publications since the start of the LHC, two books on the ATLAS detector and the physics program have been published. Work of the past two decades (detector construction phase) has been documented in internal and public notes, reviewed by the collaboration. They concern the detector design, construction, commissioning, as well as detailed physics analyses based on Monte Carlo simulations. There are over 30 ATLAS notes where I had the responsibility of the work and publication, or my contribution was prominent.

- 338 Publications on Particle Physics (Mainly on UA2, DELPHI and ATLAS experiments)
- ~11000 citations.

In the list of publications below are selected the 10 top publications where the author has a prominent contribution.

Publications where my contribution was major or I was the principal author

***Publications from the ATLAS experiment at CERN*[1]**

1. **Measurement of the ZZ Production Cross Section in Proton-Proton Collisions at √s=7 TeV with the ATLAS Detector,**
   ATLAS Collaboration, ATLAS-CONF-2011-107 (2011).
2. **Measurement of the WW Production Cross Section in Proton-Proton Collisions at √s=7 TeV with the ATLAS Detector,**
   ATLAS Collaboration, ATLAS-CONF-2011-110 (2011).
3. **Differential cross-sections of inclusive, prompt and non-prompt J/ψ production Differential cross-sections of inclusive, prompt and non-prompt J/ψ production.,**
   Nucl. Phys. B850, 387-444, 2011
4. **A first measurement of the differential cross section for the J/ψ resonance and the non-prompt to prompt J/ψ cross-section ratio with pp collisions at ps = 7 TeV in ATLAS.**
   (ATLAS conference note prepared for ICHEP 2010), ATLAS-CONF-2010-062
5. **Observation of the B± meson in the decay B±→J/ψ(μ+μ-)K±,** ATLAS-CONF-2010-098
6. A **Measurement of the ATLAS muon reconstruction and trigger efficiency using J/ψ decays,**
   ATLAS Collaboration, ATLAS-CONF-2011-021 (2011).
7. "**Expected Performance of the ATLAS Experiment - Detector, Trigger and Physics",**
   CERN-OPEN-2008-020
8. **"The ATLAS Experiment at the CERN Large Hadron Collider".**
   Journal of Instrumentation(JINST), JINST 3:S08003,2008.
9. **Studies of the performance of the ATLAS detector using cosmic-ray muons.,**
   Eur.Phys.J.C71:1593, 2011, The ATLAS Collaboration
10. **Development of large size Micromegas detector for the upgrade of the ATLAS muon system.,**
    Nucl.Instrum.Meth. A617 (2010) 161-165 Ch. Petridou + 41 authors,
11. **ATLAS H8 Testbeam data analysis combining information from the Liquid Argon Calorimeter and a Monitored Drift Tube muon tracking chamber,**
    M. Aleksa, K. Bachas, R. Lafaye, J.F. Laporte, R. Nicolaidou, C. Petridou and D. Sampsonidis *Nuclear Instruments and Methods in Physics Research Section A,Vol 572, Issue 1, 1 March 2007, Pages 117-119*
12. **Studies of catastrophic muon energy losses in ATLAS H8 combined Testbeam data.**
    K. Bachas, S. Hassani, J.-F. Laporte, R. Nicolaidou, Ch. Petridou, D. Sampsonidis, *Nuclear Physics B - Proceedings Supplements, Volumes 177-178, March 2008, 320-321.*
13. **Studies of Diboson Production with the ATLAS Detector**
    K. Bachas, *et al. Nuclear Physics B - Proceedings Supplements, Volumes 177-178, March 2008, 255-257*
14. **Extensive performance studies for the ATLAS BIS-MDT precision muon chambers with cosmic rays**
    Th. Alexopoulos et al, *IEEE Transactions on Nuclear Science, Dec 2003, Vol 50, 6, pp 2420-2425*
15. **The construction and the quality assurance–quality control of the 112 MDT-Barrel Inner Small precision chambers of the ATLAS Muon Spectrometer**
    K. Bachas, K. Bouzakis, A. Krepouri, A. Liolios, Ch. Petridou, D. Sampsonidis, I. Tsiafis, Ch.Valderanis and J. Wotschack, *Nuclear Instruments and Methods in Physics Research Section A, Volume 581, Issues 1-2, 21 October 2007, Pages 198-201*
16. **Study of the response of the ATLAS Monitored Drift Tubes to heavily ionizing particles and of their performance with cosmic rays**
    D. Sampsonidis, A. Krepouri, Ch. Petridou, M. Manolopoulou, A. Liolios and S. Dedousis *Nuclear Instruments and Methods in Physics Research Section A, Vol 535, Issues 1-2, 11 December 2004, Pages 260-264.*
17. **The first precision drift tube chambers for the atlas muon spectrometer.**
    F. Bauer, et al. Nucl.Instrum.Meth.A478:153-157,2002 (B250)

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[1] The recent ATLAS results with the indication CONF are still conference notes and in the process to be sent for publication

Publications from DELPHI experiment at CERN

18. **"Search for the standard model Higgs boson at LEP in the year 2000",**
    Phys.Lett.B499:23-37,2001,. [hep-ex/0102036] DELPHI Collaboration
19. **Lambda(b) polarization in Z0 decays at Lep.**
    DELPHI Collaboration (P. Abreu *et al*.). Phys.Lett.B474:205-222,2000
20. **W pair production cross-section and W branching fractions in e+ e- interactions at 183-GeV.**
    DELPHI Collaboration (P. Abreu *et al*.). Phys.Lett.B456:310-321,1999 (9)
21. **Measurements of the trilinear gauge boson couplings WWV (V = gamma,Z) in e+ e- collisions at 183-GeV.** By DELPHI Collaboration (P. Abreu *et al*.). Phys.Lett.B459:382-396,1999 (19)
22. **Measurement of the W pair cross-section and of the w mass in e+ e- interactions at 172-GeV.**
    By DELPHI Collaboration (P. Abreu *et al*.), Eur.Phys.J.C2:581-595,1998 (32)
23. **Measurement of trilinear gauge couplings in e+ e-collisions at 161-GeV and 172-GeV.**
    DELPHI Collaboration (P. Abreu *et al*.).Phys.Lett.B423:194-206,1998 (30)
24. **Measurement and interpretation of the W pair cross-section in e+ e- interactions at 161-GeV.**
    DELPHI Collaboration (P. Abreu *et al*.). Phys.Lett.B397:158-170,1997 (69)
25. **Measurement of the b0 - anti-b0 mixing parameter in Delphi.**
    DELPHI Collaboration (P. Abreu *et al*.). Phys.Lett.B332:488-500,1994 (19)
26. **Measurement of lambda(b) production and lifetime in Z0 hadronic decays.**
    DELPHI Collaboration (P. Abreu *et al*.). Phys.Lett.B311:379-390,1993 (31)
27. **A study of b0 - anti-b0 mixing using semileptonic decays of b hadrons produced from Z0.**
    DELPHI Collaboration (P. Abreu *et al* Phys.Lett.B301:145-154,1993 (31)

Publications from the UA2 experiment at CERN

28. **Direct measurement of the W-γ coupling at the CERN antip-p collider.**
    UA2 Collaboration (J. Aliti *et al*.). Lett.B277:194-202,1992 (90)
29. **A measurement of electron - tau universality from decays of intermediate vector bosons at the cern anti-p p collider**. UA2 Collaboration (J. Alitti *et al*.), Z.Phys.C52:209-218,1991 (24)
30. **Measurement of W and Z production cross-sections at the CERN anti-p p collider.**
    By UA2 Collaboration (J. Alitti *et al*.), Z.Phys.C47:11-22,1990 (49)
31. **Search for top quark production at the CERN anti-p p collider**.
    By UA2 Collaboration (T. Akesson *et al*.), Z.Phys.C46:179,1990 (65)

Publications from pp and pd experiments at BNL

32. **Search for narrow structure in proton anti-proton annihilation cross-sections from 1900-MeV to 1960- MeV.**
    T. Brando, I. Daftari, A. Deguzman, T.E. Kalogeropoulos, R.A. Lewis, D.I. Lowenstein, R.J. Miller, B.Y. Oh, D.C. Peaslee, C. Petridou, M. Singer, G.A. Smith, G.S. Tzanakos, R. Venugopal, R.D. Von Lintig, J. Whitmore Phys.Lett.B158: 505-510,1985 (13)
33. **Search for monoenergetic gamma rays produced in anti-p p annihilation at rest.**, T. Brando, C. Bromberg, I.K. Daftari, T. Kalogeropoulos, R.A. Lewis, D. Lowenstein, R. Miller, B.Y. Oh, G. Onengut, D.C. Peaslee, C. Petridou, T. Potter, G.A. Smith, G. Tzanakos, J. Whitmore (Brookhaven & Michigan State U. & Penn State U. & Syracuse U.). 1984. Phys.Lett.B139:133-138,1984.

PhD Thesis

In search of narrow proton - anti-proton bound states: high resolution gamma and charged pion spectra from protonium. Chariclia I. Petridou (Syracuse U.). UMI 84-00785-mc (microfiche), Aug 1983. 149pp. Ph.D.Thesis.

Significant Research Achievements in the past 10 years

Research Achievements

The period from 1999 until the start of the LHC operation in Nov. 2009, was the period of heavy **detector construction, quality tests and operation** for the ATLAS detector and the last four years before the start, the detailed study of the **performance and the physics at LHC**. My contribution and the contribution of the AUTh group was on both these fronts, substantial.

• The first major achievement in my record in the past 10 years was the **creation and operation of a High Energy Physics Laboratory** for the construction and test of the ATLAS Muon Chambers.

This project was funded originally from the EPET II platform of the General Secretary of Research and Technology (GSRT), which was opened for projects of leading edge technologies, through competition.

1st important achievement during this period (1999-2004) was:

• the on schedule production and tests of the muon detectors

• their excellent quality in precision construction, verified by the X-ray Tomograph at CERN

• their on time installation in the ATLAS experiment

2nd achievement was the coherent collaboration of the three greek institutes involved (AUTh, UoA, NTUA), in order to bring this challenging work into completion

3rd, we gained recognition inside the vast ATLAS Collaboration (>3000 Physicists and engineers), where strong institutes from around the world (Europe, USA, Japan, Russia) are participating

4th, During this period we produced excellent young researchers that we were able to support -Physics graduates (>40), MSc diplomas (4) and PhD's (2)-; 1 PhD received the "best thesis" award by the ATLAS Muon Collaboration. The young researchers worked in the lab with us and gained experience on frontier fields in Physics and Technology

During this period I was responsible for the certification of the Chamber Construction site in China, where our group exported the knowhow on chamber construction. (for the entire construction period see publications 8, 9, 14-17)

• In parallel with the chamber construction, test and installation, as the GRID technology appeared to be the answer for the vast amount of data expected at LHC, I worked towards the creation of a **pilot GRID site at AUTh** via the IST-CrossGrid EU research network. The success of the project cannot be understated; as a result, a certified GRID node is functioning today at AUTh, which is and will cover our needs for the current project.

• In the period 2004-2006 our group participated in the **Test Beam activities**, where we tested one of our chambers and the results were published and highly appreciated by the Collaboration (see publication 11)

• On the Muon Detector Performance studies, with my initiative, we created a group, in collaboration with Saclay, to study several aspects of the **muon identification and performance**, one of them being the "Catastrophic Muons". (see publication 12)

• In the same period we were involved in the first **complete studies of muon detector performance and physics**. The results of the collaboration wide studies were documented in the CSC Book of ATLAS (> 2000p), where our group (small in size) had a sizable contribution, both on physics topics : B-Physics and Dibosons, as well as on muon detector performance and muon reconstruction (see publications in 7 above).

• In all these years I tried to maintain substantial collaboration with other institutes both on the construction and on the performance and physics (Saclay, Nikhef, MPI, Freifurg, Frascati etc).

• As a result a core of four scientists (Saclay, Sheffield, UCLondon, AUTh) submitted in 2005 a proposal to EU for physics at LHC and in particular for the search for the Higgs boson. The ARTEMIS network was an example of actual collaboration and created a pool of excellent quality young researchers, with whom we are still in close collaboration as can be also seen in this proposal.

• In the period 2008-2010, I was the **convener in the B-Physics working group of ATLAS** (I planned and coordinated the work of more than 100 scientists from over 15 Institutes from around the world). That was an exciting period as, during the first year, I had to lay the way for the analysis of the first LHC data and carefully plan the activities of the groups such that with the start of LHC we would be able to provide first measurements in the collaboration and the world. This goal was accomplished and the work has been documented indicatively in publications 3 - 6 above.

My goal, by applying for this project is to be "PRESENT", as Greece and as AUTH, right in the heart of the Physics at LHC, the best machine and experiments ever built on earth. As a group and as physics case, I believe we are able to make an important contribution to the discoveries of the next 3 years; to create the conditions to participate at Super LHC in the future; to produce spin-off technologies from our R&D projects and to create competent young researchers for Greece and Europe.

Publications

The most significant publications representative of my contribution to Particle Physics the past 10 years are shown above: publications 1through18 and in the appropriate link in the short CV.

INVITED PRESENTATIONS TO INTERNATIONAL CONFERENCES

2010 Blois-2010 : *B-Physics Status and perspectives with the ATLAS Experiment.*
2009 Turkish Physical Society 26th International Physics Conference : *The ATLAS Experiment: Present and Future.*
2008 Xth Workshop on High Energy Physics Phenomenology (WHEPP X), Madras, India: *Physics at LHC and the First data in ATLAS.*
2008 TWEPP-2008, Naxos, Greece; *The High Energy activity in Greece.*
2005 Hadron Collisions Physics 2005 (HCP-05), Les Diablerets, Switzerland: *B-Physics at LHC with the ATLAS and the CMS Detectors.*
2004 FourSeas-04, Thessaloniki, Greece: *The ATLAS Muon System.*

INVITED SEMINARS

2001 IHEP Beijing, China: The ATLAS Muon Spectrometer
2003 University of Regina, Canada:"Physics at LHC with the ATLAS Muon Spectrometer"
2005 University of Wuppertal, Germany: "Present Status of the ATLAS Muon Spectrometer, the Greek Contribution and Physics Prospects"

RESEARCH PROJECTS, APPROVED BY THE GREEK FUNDING AGENCY OR BY THE EUROPEAN UNION (2000-TODAY)

The Research Projects listed below in reverse chronological order, are projects where I was either the Principal Investigator or participated as researcher. The source of funds is either the European Union (EU), or the General Secretariat of Research and Technology of Greece (GSRT). The main bulk of them are projects I obtained through competition and concern the construction of the Laboratory for the construction and test of the ATLAS Muon Chambers. (In what follows I make the distinction between Principal Investigator and Scientific Responsible. In the case of Scientific Responsible I did not have the full responsibility of writing the proposal; I had only contributed the parts concerning the activity of the AUTh group, the contrary was true in the first case).

1. **HERAKLEITOS (GSRT):** project for funding a PhD student: "Physics of the b-quark with the first data of ATLAS" (Oct 2010, 3 years) (33K euro), Principal Investigator
2. **FP7-INFRASTRUCTURES-2010-1 (EU): AIDA,** Advanced European Infrastructures for Detectors at Accelerators,(2011-2015) (256 K euro, for Greece), (Principal Investigator: D. Sampsonidis) Working on Performance studies of the MicroMegas detectors
3. **IST (GSRT): AIDA,** "ATLAS Graphical Interface for Distributed Analysis" (2007, 1 year) (50 K euro), (Principal Investigator: D. Sampsonidis) Consultant work
4. **FP6-Marie Curie RTN (EU): ARTEMIS- '**Study of the Spontaneous Symmetry Breaking and the Origin of Mass with the ATLAS experiment' (Oct. 2006 – Sept. 2010) (400k euro, for AUTh only) (Scientific Responsible for AUTh only, Member of the Management board and convener of the Standard Model studies)
5. **EPAN (GSRT):** "Certification and installation of the BIS chambers at CERN" (May 2005 – Aug. 2008) (100K euro), Principal Investigator
6. **PYTHAGORAS II (GSRT):** Completion, Certification and Installation of the Greek muon detectors (Jan 2005 – Dec. 2007) (50K euro), Principal Investigator

7. **AUTh Network (Research Committee of AUTh):** A Laboratory Network for dissemination of GRID (October 2003-September 2005) (6K euro) (Responsible N. Vlachos), Responsible for the dissemination for the Grid Technology at AUTh
8. **HERAKLEITOS (GSRT):** project for funding a PhD student: "Performance of ATLAS Muon Spectrometer in Cosmic rays and in Test Beam" (March 2004-Febr. 2007) (33K euro), Principal Investigator
9. **Application of GRID for ATLAS data analysis in AUTh** (May 2004 – April 2006) (90K euro) (Scientific Responsible). The project was never realized on my demand
10. **EPAN Transnational Projects (GSRT):** Technology transfer to China on GRID Technologies for ATLAS data analysis (January 2004-December 2005) (17K euro), Principal Investigator
11. **TMR (Marie-Curie, EU): Return Grant** 'Software Development for the ATLAS Muon Detector' (November 2002) (50K euro) , Principal Investigator
12. **IST(EU):** The CROSSGRID project (March 2002-February 2005) (150K euro) (Scientific Responsible only for AUTH)
13. **GSRT: The Greek ATLAS Project (September 2001-December 2002) (70 K euro),** (Scientific Responsible)
14. **PENED (GSRT):** 'Defining the optimal two component glue for the MDT chambers in a high radiation environment' (January 2000, 2 years) (200K euro) (Responsible I. Tsiafis), I Supervised the students who studied the chamber deformations.
15. **EPAN (GSRT): Transnational Projects (GSRT):** Technology transfer to China for the building of the MDT chambers (September 2000-August 2003) (15K euro) (Responsible S.Dedoussis), I Realised the creation of a chamber construction site in Beijing.
16. **EPET II (GSRT):** 'Development of slow controls system for MDT's in ATLAS' (March 2000) (15K euro) (Responsible only for AUTh, A. Liolios), I coordinated and worked myself on the Quality control of the MDT chambers
17. **EPET II (GSRT):** 'Wiring and test of drift tubes for the ATLAS Muon Spectrometer' (March 2000) (15K euro, 3 years) (Scientific Responsible only for AUTh)
18. **EPET II (GSRT):** 'Construction and test of high precision Muon chamber for ATLAS' (March 2000, 3 years) (300K euro) (Scientific Responsible)