Amir Farbin

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Date of birth: July 23, 1975
Citizenship: US

Education

University of Maryland **College Park, MD**
Aug 97 - June 03
Ph.D. in Physics.
Dissertation: "Measurement of CP Asymmetries and Branching Fractions in Two-body Neutral B Meson Decays to Charged Pions and Kaons with the *BABAR* Detector"
Thesis advisor: Hassan Jawahery.

Massachusetts Institute of Technology **Cambridge, MA**
Sep 93 - Jun 1997
S.B. in Physics, June 1997.
Dissertation: "The Study of Hadronization Using Deep-Inelastic Muon Scattering with Hydrogen and Deuterium Targets"
Thesis advisor: Louis Osborne.

Highlights of Research Experience

Research Fellow **ATLAS- CERN**
March 05 - Present
Manager of Hadronic (Tile) Calorimeter Level-1 Trigger installation, integration, commissioning, and calibration activities. ATLAS Analysis Model Coordinator. Physics Analysis Tools Developer. Co-convenor of CERN SUSY working group. Various Jet, Electron, and Photon calibration and identification activities.

Research Associate **ATLAS- University of Chicago**
May 04 - Feb 05
Performed first study of backgrounds to inclusive SUSY searches with Geant4 simulated data by "hacking" US GRID. Helped build local Tier 2 Computing Facility. Gave physics analysis tutorials.

Postdoctoral Research Assistant ***BABAR* Group- UMD**
June 03 - April 04
Applied a new vertexing technique to extract time-dependent CP violating asymmetries in $B^0 \to K^0\pi^0$ and $B^0 \to K^{*0}\gamma, K^{*0} \to \pi^0 K^0_s$ decays. Build new analysis tools to take advantage of *BABAR*'s computing model 2.

Graduate Research Assistant ***BABAR* Group- UMD**
June 98 - May 03
Under the direction of Hassan Jawahery, participated in all analyses in the charmless two-body group. Contributed to various *BABAR* calibration and performance procedures and studies. Made first and several

subsequent measurements of branching fraction, direct and time-dependent CP violating asymmetries in $B^0 \rightarrow h^+h^-$ decays. Developed various physics analysis tools. Extracted silicon detector alignment parameters.

Undergraduate Research Assistant **Laboratory for Nuclear Science- MIT**
Jun 96 - Jun 97
Under the direction of Louis Osborne, studied Hadronization using data obtained from Fermilab deep inelastic muon (DIS) scattering experiment E665.

Undergraduate Research Assistant
Center For Theoretical Condensed Matter Physics- MIT
Jun 95 - Jan 96
Under the direction of Tomas Arias, investigated methods of efficiently performing quantum mechanical electronic structure calculations by representing wavefunctions in a basis of localized functions called Interpolet Wavelets. Focused on the development of superior atomic pseudopotentials.

Undergraduate Research Assistant
Center For Theoretical Condensed Matter Physics- MIT
Sep 94 - Jan 95
Created several educational software programs for MIT's "Quantum Physics I" course.

Undergraduate Research Assistant
Laboratory for Computer Science / Artificial Intelligence Laboratory- MIT
Jun 94 - Sep 94
Helped port the *MIT Scheme* programming language to *Windows* and *Windows NT*.

Teaching Experience

Graduate Teaching Assistant **Physics Department- UMD**
Aug 97 - Jun 98
Conducted discussion and lab sessions for the "Fundamentals of Physics I" course. Held discussion sessions for "General Physics: Vibrations, Waves, Heat, Electricity and Magnetism" and lectured during the absence of the instructor.

Undergraduate Teaching Assistant **Physics Department- MIT**
Aug 96 - May 97
Assisted undergraduate physics students with performing and analyzing the results of table top experiments for MIT's "Experimental Physics I and II (Junior Lab)" courses.

Overview of Research Experience

BABAR Graduate Research Assistant

University of Maryland, June 98 - May 03

A primary goal of the *BABAR* experiment is to study in the Standard Model (SM) picture of CP violation by testing the unitarity of the Cabibbo-Kobayashi-Maskawa (CKM) matrix. Typically this task is represented geometrically as a test of the closure of a unitarity triangle whose angles are related to different CKM elements. Each angle of this triangle is extracted through studies of a specific set of B decays. Checking the consistency of different measurements of these angles provides a means of detecting new physics.

Charmless Two-body B Meson Decays

Under the direction of Hassan Jawahery, my primary research centered about the two-body charmless decays of B_d's into charged and neutral kaons and pions, which are sensitive to the CKM Unitarity Triangle angles α and γ. The B-factories, having discovered CP violation in B meson system through the measurement of $\sin 2\beta$ [21, 20, 184], considered the analysis of these charmless modes as one of their most important priorities. Experimentally the small branching fraction ($\approx 10^{-6}$), large backgrounds, and unique kinematics of these decays required the development of specifically tailored analysis techniques. I was involved in nearly all aspects of the measurements performed within *BABAR*'s charmless two-body group. Our analyses generally provided the most accurate measurement of virtually all $B \to hh'(h = \pi^{\pm,0}, K^{\pm,0})$ branching fractions/upper limits and CPV asymmetries at the time [23]-[35].

For my thesis [31], I focused on the most challenging of these measurement, the extraction of the time-dependent CP asymmetries in $B^0 \to \pi^+\pi^-$ decays, which is sensitive to the angle α. As a result, I designed and implemented a fit which simultaneously extracted all branching fractions and CPV asymmetries in the $B^0 \to h^+h^-, (h = \pi, K)$ decays. This technique, which lead to the very first measurement of time-dependent CP asymmetries in a rare B decay [34], has served as the template for nearly all other rare time-dependent CPV analyses in *BABAR*. In 2004, a reapplication of my thesis analysis led to the discovery of direct CP violation in $B^0 \to K^+\pi^-$ decays [26].

Analysis Tools

Before arrival of *BABAR*'s first data, I designed a general purpose analysis suite within *BABAR*'s software framework. This package was eventually named *NonCharmUser* and served as the basis for all of the measurements in the two-body charmless group. The most distinguishing feature of *NonCharmUser* was its ability to permit users to be perform analyses by configuring general purpose *modules* through *tcl* scripts and without writing any C++. This allowed standardization and sharing of analysis procedures and very quick turn around on any ideas.

In order to perform the statistical analysis I deemed necessary for my thesis measurement, I wrote *LMinuit*, a general purpose data-modeling package which allowed implementing complex maximum-likelihood fits and toy Monte Carlo simulations in a *LISP* based scripting language [1]. Prior to *LMinuit* such tasks were typically performed in specialized Fortran or C++ code which were usually tailored to a specific analysis and were often difficult to maintain and scale. Such issues limited the complexity of the resulting analyses. In contrast, *LMinuit* allowed me to easily build an optimal analysis where I simultaneously extracted nearly all required information (≈ 120 parameters) from signal, control, and background samples (≈ 75000 events) along with the principle measurements. The application of such complicated fit models was facilitated by *LMinuit*'s evaluation-caching feature which reduced fit times by orders of magnitude. And since *LMinuit* allowed turning a fit model into a Monte Carlo model, I was able to perform various statisical analyses and rigorously assess the systematic uncertainties of various assumptions. Ultimately *LMinuit* served for several years as the statistics package for all the two-body charmless measurements, only to be replaced by *RooFit* after a student spent one year interacting with *RooFit* developers to reproduce my thesis measurement.

I was also the package coordinator of *Cornelius++*, a general purpose discriminant tool used for building neural networks, Fisher discriminants, etc. I used this package for various flavor-tagging studies and to design and implement the background suppression strategy for the two-body charmless group.

Silicon Detector Alignment

I extracted and validated the local alignment of *BABAR*'s silicon vertex tracker for all *BABAR* data taken before January 2002 and used for *BABAR*'s summer 2002 results. Using $e^+e^- \to \mu^+\mu^-$ and cosmic-ray muon's, the alignment procedure obtained 6 translation/orientation parameters for each of the detector's 340 silicon wafers by minimizing track residual. While good alignment of this detector benefited most analyses through improved tracking performance, CP and lifetime analyses in particular relied on the precise vertexing provided by the accurate knowledge of the positions of detector elements.

General Experience

Having been involved in *BABAR* since before taking data, I was very fortunate to participate in the excitement of commissioning a new detector and extracting the first measurements. Since I had prepared a suite of general analysis tools before first collisions, I was the first to fully reconstruct various resonances and identify problems in early data. I developed the first multivariate background suppression technique in *BABAR*. I contributed to the first extractions of tracking, K_S, and π_0 reconstruction efficiencies and helped develop the first technique of high momentum particle identification. I also contributed to flavor tagging studies using slow pions. At the end of my *BABAR* career I had helped bring a different new measurement to a conferences on seven different occasion. Finally, my four year tenure at SLAC provided me with the opportunity to regularly participate in the operational duties as on-call Drift Chamber expert and shift-leader.

Postdoctoral Research Associate

University of Maryland, June 03 - April 04

Immediately after receiving my PhD, I began my postdoctoral career by initiating and then leading the effort to use a new vertexing technique to measurement the time-dependent CPV asymmetries in $B^0 \to K^0\pi^0$ [25] and $B^0 \to K^{*0}\gamma, K^{*0} \to \pi^0 K^0_s$[24] decays. Prior to leaving, I designed and help implement a new data-modeling package (*MLFit*) built on *RooFit* and a new framework analysis package (*NonCharmUser2*) based on *BABAR*'s new *Computing Model 2*.

Search for New Physics

Since the leading tree decay amplitude for $B^0 \to K^0\pi^0$ decays is CKM suppressed, its time-dependent CP violating (CPV) asymmetry measures the angle β from a loop diagram. This measurement can be directly compared to β extracted from the tree-dominated $B^0 \to J/\psi K^0\pi^0$ (aka "Golden mode") decays, providing some limits to new physics contributions from Supersymmetry (SUSY) or extra-dimensional gravity. The implications of CP asymmetry in $B^0 \to K^{*0}\gamma, K^{*0} \to \pi^0 K^0_s$ decays, however, are more interesting. Here, parity violation leads to the expectation of negligible time-dependent CP violation in the Standard Model. But more left-right symmetric new physics models lead to significant enhancement of the CPV asymmetry.

Prior to our measurements, extracting time-dependent CPV asymmetries from these B decays were generally deemed impossible because their final states contain no charged particles which are directly emitted from the B meson. However, I lead a small team to engineer, validate, and apply a new vertexing technique to extract these measurements. We presented our first results at Lepton-Photon 2004 [22], just two months after starting the project. I was the primary editor of both papers which were published in PRL, [25, 24]

Analysis Tools

Since as a graduate student I had provided all of the analysis software for the *BABAR* Charmless two-body group, I felt compelled to update the group's software before leaving *BABAR*. The resulting *NonCharmUser2* analysis package, which takes full advantage of *BABAR*'s new Computing Model 2, is presently being used by the group.

I also designed *MLFit*, a interface to *RooFit* which is a data-modeling package now built into ROOT. Fundamentally, this interface is a reimplementation of high-level concepts which I had built into *LMinuit*. *MLFit* allows significant reduction in the development time required to build new fits, combine measurements, perform toy Monte Carlo studies, produce plots, assess systematics, and calculate limits. *MLFit* was used for several measurements after my departure from *BABAR*.

ATLAS- Postdoctoral Research Associate

University of Chicago, June 03 - April 04

During my short tenure at University of Chicago (UC), I concentrated on familiarizing myself with ATLAS and the Large Hadron Collider (LHC) environment. Faced with inadequate computing resources and the lack of large samples of fully reconstructed simulated events, I developed a user GRID job submission framework for the US GRID and then reconstructed a large number of events. I used this sample to perform ATLAS's first SUSY background studies using fully simulated Geant4 events [2].

I also made a considerable effort to establish an analysis environment for the ATLAS Midwest Physics group using Chicago's then proto-type Tier 2 GRID center. I helped design and deploy the cluster's architecture, provided batch and interactive computing environments, setup the ATLAS software, provided local data samples, and gave well attended tutorials. I also contributed to the now accepted Midwest Tier 2 proposal.

ATLAS- Research Fellow

CERN, March 05 - Present

Since my *BABAR* career was dominated by physics analysis activity, I choose to exploit the few years before the LHC turn-on to accrue hardware experience, and to draw on my experience with modern analysis techniques and the practicalities of producing measurements from large dataset to help ready ATLAS software for the physics analysis challenges that lie ahead. Recently I have begun concentrating on exercising specific calibration and analysis strategies which may be applied to the first LHC data.

My current activities within the CERN ATLAS team are divided between the Tile Calorimeter (TileCal) group, managing all Level-1 (L1) Trigger activities, and the Computing group, serving as the ATLAS Analysis Model (AM) Coordinator and developing much of the ATLAS Physics Analysis Tools. I also co-convene the CERN SUSY working group and contribute to electron and jet calibration and electron and photon identification activities.

Tile Calorimeter

Within TileCal, I have been overseeing the installation, commissioning, integration, and calibration of the L1-trigger system. I have also been involved with various TileCal commissioning activities [5], analysis of cosmic-ray data, and serve as the TileCal representative in the ATLAS Reconstruction Integration Group.

I am responsible for managing all issues related to the L1-specific portions of the TileCal front-end (FE) electronics, the long analogue cables which deliver the trigger signals to the back-end (BE) L1 Calorimeter (L1Calo) trigger system, and the Local Trigger Processor system which communicate trigger decisions back to the TileCal electronics [10]. One of my primary roles is the liaison between the TileCal and the L1Calo communities, organizing any activities which requires both systems, such as taking combined runs, working through integration issues, and developing the L1 hardware calibration strategy.

During summer 2005, I led the effort to identify problems in the analogue cables and evaluate their impact on physics. This activity resulted in a decision to replace all such cables and required iterations with various manufactures to achieve the necessary specifications and ensure delivery of sufficient cables for our aggressive installation schedule.

Since the calibration of the L1 system relies heavily on the TileCal FE charge-injection system (CIS), a student and I have developed a new software package (*TileCIS*) to provide a powerful and intelligent interface to the CIS without requiring detailed understanding of the TileCal electronics. By explicitly designing *TileCIS* to able to quickly produce arbitrary signal patterns in the Tile electronics, we have opened up the possibility of "injecting" complex objects (eg jets) to evaluate and optimize the response of the higher level L1Calo components.

Recently, I have been exploiting stable operations of significant portions of installed TileCal detector to initiate an effort to develop a deployable L1 calibration strategy. We have have been using TileCal standalone cosmic triggers and some fast Analogue to Digital Converters (ADC) to capture cosmic-ray signals from the Tile trigger output. This data allows us to test our strategy of extrapolating the CIS signals to those expected from particles traversing the detector. I have also initiated tests of using the Tile Muon trigger output as a permanent standalone cosmic trigger system.

Analysis Model

In summer of 2005, I took the a fortuitous opportunity to speak to the CERN's Applicaton Area meeting to propose an analysis model for ATLAS, covering computing resource management, algorithmic analysis, the statistical techniques, and general methodology and management issues [3]. Consequently I was installed as the first ATLAS Analysis Model (AM) coordinator and began an effort to reconcile physics analysis requirements with various components of the ATLAS offline software and computing infrastructure.

My first concentration was in developing common analysis tools in order to create a powerful and compelling analysis environment in the ATLAS software framework [6] (see Physics Analysis Tools below). The resulting *EventViewBuilder Toolkit* is the basis of the Analysis Model recently adopted by the ATLAS physics coordination for the upcoming Computing Service Challenge (CSC).

In the beginning of 2006 I began concentrating on refining the ATLAS Event Data Model (EDM) to match expected analysis and calibration requirements [7]. These were discussed at the 2006 Physics Analysis Tools

Workshop (Tokyo, Japan), where my proposal [8] of merging combined reconstruction objects, saved in the Event Summary Data (ESD), with analysis objects, saved in the Analysis Object Data (AOD), was widely accepted and is now being implemented. Recently I proposed the addition of interfaces to AOD which allow direct ROOT (a popular analysis environment) access to all ATLAS analysis data. These two elements are the basis of the Analysis Model I have proposed for ATLAS [9], which provides a unified framework and data format for successive refinements between the ESD, the AOD, and the various levels of Derived Physics Data (DPD) produced in the course of analyses. This model also provides natural path for the evolution of the EDM contents, which experience from other experiments suggests will result in the gradual devaluation bulky and high latency ESD in favor of richer and more accessible AOD.

Very recently (Oct 25-28th) I organized a three day workshop on Analysis Models [11], which included invited panelists from D0, CDF, *BABAR*, H1, and CMS. The workshop sessions, which were dominated by discussions, covered Computing Model, Data Access, MetaData, Databases, Streams, Tags, Trigger, Reconstruction, Data Preparation, Event Data Model, Physics Analysis Tools, and Distributed Analysis. Though not fully digested yet, the workshop has already had a clear impact. I am currently organizing the AM workshop summary note.

Physics Analysis Tools

I co-authored *EventView* [14], an analysis helper tool intended to encapsulate multiple consistent interpretations of every event. The original *EventView* concept focused on particle selection and overlap removal between particle candidates. I expanded *EventView* to also store user observables (*UserData*) and then refined the *EventView* concept to allow simultaneous consideration of the state of multiple parallel analyses [4]. Once I implemented these basic foundations, I developed an analysis framework which encapsulates typical analysis tasks into general tools. The resulting *EventViewBuilder Toolkit*, which is modeled after the *NonCharmUser2* analysis package I wrote before leaving *BABAR*, provides tools for observable calculation, selections, combinatorics, systematics evaluation, recalibration, and ntupling. I have given numerous very well attended tutorials on this framework [15], which is now the basis of *HighPtView*, *TopView*, *SUSYView*, and numerous other analysis packages used in the respective ATLAS Analysis Working Groups (eg Higgs, Exotics, Standard Model). I have also helped many individuals to design and implement their own analyses.

Recently I have been incorporating tools for "trigger-aware" analysis into the *EventViewBuilder* Framework. The next steps in this project will involve building an interactive analysis environment and implementing my proposal of *ParticleView* (see Japan report [8]), an essential component for the proposed new analysis model.

I have also just begun a collaboration to build a general statistical framework based on my *BABAR* experience. Ideally this framework will encapsulate building models, building discriminants, fitting, calculating limits, and other high-level statistical analysis concepts.

Electron, Jet, and Missing Et Calibration

ATLAS's primary Jet Calibration procedure is based on an ambitious Local Hadronic Calibration strategy, where detailed analysis of Geant4 simulations provide cell-based compensation corrections. However, a much simpler sampling-based calibration has been shown to perform nearly as well as the current cell-based corrections. Since this simpler calibration can be derived and applied during physics analysis, it eliminates the latency of tape access and reprocessing from the Jet Calibration procedure. In very early data taking it also provides an avenue of directly deriving calibration constants from beam data rather than waiting for validation of the simulation. And, as the Local Hadronic Calibration matures, such data-driven procedures can provide the additional Jet specific corrections. My campaign for this approach has helped establish sampling-based calibration as an endorsed ATLAS jet calibration procedure.

Jet/γ/Z+Jet events and W decays are often used for jet validation, assessment of jet systematics, "in-situ" jet corrections, and/or derivation of the jet calibration. With the aid of a student, I have been studying a broad range of physics and technical issues related to such procedures [13]. These include studies of parton/hadron level jets, quark/gluon-jet content of samples, initial/final state radiation, underlying event, minimum-bias (pile-up), backgrounds, and building unbiased and robust fits. As a result we have implemented fully data-driven jet calibration using p_T balancing of γ+Jet, 2 and 3 Jet events, and are now investigating the practicality of applying this procedure to early data (100/pb). My primary motivation for developing this strategy is for understanding and calibrating ATLAS's jet and missing energy response for Supersymmetry searches in early data (see below).

Recently I have started leading two new students through projects which relate to this calibration effort. One student is building a photon identification strategy for the γ+Jet calibration using a similar approach to the electron identification effort described in the Supersymmetry section below. Another student is expanding some my earlier electron studies in an attempt to directly extract derive electron layer calibration weights from Z decays in data.

Supersymmetry

The Large Hadron Collider's (LHC) opening of the 14 TeV energy frontier will immediately permit tests of many new physics theories. It is likely that a non-trivial portion of Supersymmetry (SUSY) parameter space can be explored with a mere 100/pb of LHC data. To this end, I have helped organize and lead the CERN SUSY working group within the CERN ATLAS team. Our primary concentration has been on single lepton+N jet+missing energy inclusive SUSY search with additional activity on di-lepton searches and comparisons of model dependent versus independent analysis strategies.

My first focus in the CERN SUSY group was to build necessary infrastructure to attract and support other members of the CERN team, where CERN's commitments to the ATLAS detector and software leave little room for investment in developing physics analyses. I co-authored *SUSYView*, an *EventView*-based analysis package which is now widely used and officially adopted by the ATLAS SUSY Working Group (WG). I then established a procedure to use CERN computing resources for SUSY analyses, gathering all relevant data at CERN which I would regularly process with *SUSYView* and provide for the ATLAS SUSY WG. The CERN group now has a large following, including many who not members of the CERN team.

Within the CERN SUSY group I have been emphasizing building analyses which may be applied to early data by employing techniques which can be quickly tuned and validated with little reliance on simulation or the need to wait for data reprocessing or tape access. For example, our group has developed an electron identification technique which performs significantly better than the standard ATLAS electron identification. This improvement is mostly due to the fact that while the standard techniques require data reprocessing for tuning, our's can be applied at the latest stages of analysis and is therefore much more flexible. Recently the group has started focusing on assessing electron identification performance from Z decays in data and then extrapolating to the much more complicated SUSY and Top environments.

My Jet Calibration activities, described in previous section, are generally motivated by the requirements of early SUSY analyses, where controlling fake missing energy signatures from QCD backgrounds is one of main difficulties. Here, understanding and controlling the jet response, which is highly correlated to the missing energy measurement, is crucial. Recently, I have been investigating using the sampling-calibration, described above, for the calculation of missing energy in the context of SUSY and its backgrounds.

References

Select ATLAS Talks, Meetings, Tutorials, and Documentation

[1] "Practical Statistics Experience from BaBar", ATLAS Statistics Workshop, January 2007. [http://indico.cern.ch/conferenceDisplay.py?confId=8374]

[2] "SUSY Studies in DC2", First North American Physics Workshop, December 2004. [http://indico.cern.ch/conferenceDisplay.py?confId=a045605]

[3] "Interactive Analysis in ATLAS (thought on Analysis Model)", CERN Application Area Meeting, July 2005. [http://indico.cern.ch/conferenceDisplay.py?confId=a054332]

[4] "EventView Recent/Future Developments", ATLAS Software Workshop, September 2005. [http://indico.cern.ch/conferenceDisplay.py?confId=a045109]

[5] "Tiles Phase I", ATLAS Overview Week, October 2005. [http://indico.cern.ch/conferenceDisplay.py?confId=a052637]

[6] "Analysis Model Status", ATLAS Software and Computing Workshop, December 2005. [http://indico.cern.ch/conferenceDisplay.py?confId=a045110]

[7] "Analysis Model/Tools", ATLAS Software and Computing Workshop, April 2006. [http://indico.cern.ch/conferenceDisplay.py?confId=a057207]

[8] "Analysis on AOD/ESD: Maintaining the same interface", ATLAS Physics Analysis Tools Japan Workshop, May 2006. [http://indico.cern.ch/conferenceDisplay.py?confId=a062235]

[9] "Highlights of Analysis Model Workshop", ATLAS Tigger and Physics Week, October 2006. [http://indico.cern.ch/conferenceDisplay.py?confId=6824]

[10] "TileCal L1 Signals and Calibration", Level-1 Calo Joing Meeting, November 2006. [http://indico.cern.ch/conferenceDisplay.py?confId=a062780]

[11] Analysis Model Workshop, October 2006. [http://indico.cern.ch/conferenceDisplay.py?confId=6866]

[12] "User's Taskforce Report", ATLAS Rome Physics Workshop, June 2005. [http://indico.cern.ch/conferenceDisplay.py?confId=a044738]

[13] "Studies with gamma+jet events", ATLAS Trigger and Physics Week, Oct 2006 (talk by M. Hurwitz). [http://indico.cern.ch/conferenceDisplay.py?confId=6198]

[14] EventView Documentation. [https://twiki.cern.ch/twiki/bin/view/Atlas/EventView]

[15] EventView Builder Tutorial. [https://twiki.cern.ch/twiki/bin/view/Atlas/EventViewBuilderTutorialConf]

Select Talks, Colloquia, and Posters

[16] Talk at CKM Angles Physics and Planning Workshop, Menlo Park, CA. *Measurement of* $\sin 2\beta$ *in Charmless B Decays.*, Oct 2003.

[17] Planery talk at *BABAR* Collaboration Meeting, Menlo Park, CA. *Analysis of Time-dependent CP Asymmetry in* $B^0 \to K_S\pi^0$, July 2003.

[18] Invited talk at $XXXV^{th}$ Electroweak Rencontres de Moriond, Les Arcs (France). *Measurements of CP asymmetries and branching fractions in* $B^0 \to \pi^+\pi^-, K^+\pi^-, K^+K^-$, Mar 2002.

[19] 2001 American Physical Society Meeting, Washington DC. *Two-body charmless B decays to charged pions and kaons at BABAR*, Apr 2001.

[20] Planery talk at *BABAR* Collaboration Meeting, Menlo Park, CA. *Analysis of Time-dependent CP Asymmetry in* $B^0 \to \pi^+\pi^-$ $(\sin 2\alpha')$, Jun 2001.

[21] Direct CP Workshop, Menlo Park, CA. *Time-dependent CP Studies in* $B^0 \to \pi^+\pi^-$, Dec 2000.

[22] Poster at Lepton Photon 2003, Batavia, IL. *Measurement of Time-dependent CP Asymmetries in Charmless Two-body Decays (*$B^0 \to K^0\pi^0$ *and* $B^0 \to \pi^+\pi^-$*)*, Aug 2003.

Select Journal Publications with Leading Contribution

[23] B. Aubert *et al.* [BABAR Collaboration], *Improved Measurements of CP-Violating Asymmetry Amplitudes in* $B^0 \to \pi^+\pi^-$ *Decays*, Phys. Rev. Lett. **95**, 151803 (2005) [arXiv:hep-ex/0501071].

[24] B. Aubert *et al.* [BABAR Collaboration], *Measurement of time-dependent CP-violating asymmetries in* $B^0 \to K^{*0}\,\gamma$ *(*$K^{*0} \to K^0_S\,\pi^0$*) decays*, Phys. Rev. Lett. **93**, 201801 (2004), [arXiv:hep-ex/0405082].

[25] B. Aubert *et al.* [BABAR Collaboration], *Measurements of CP violating asymmetries in* $B^0 \to K^0_S\,\pi^0$ *decays*, Phys. Rev. Lett. **93**, 131805 (2004), [arXiv:hep-ex/0403001].

[26] B. Aubert *et al.* [BaBar Collaboration], *Observation of direct CP violation in* $B^0 \to K^+\,\pi^-$ *decays*, Phys. Rev. Lett. **93**, 131801 (2004),[arXiv:hep-ex/0407057].

[27] B. Aubert *et al.* [BABAR Collaboration], *Branching fractions and CP asymmetries in* $B^0 \to \pi^0\,\pi^0$, $B^+ \to \pi^+\,\pi^0$ *and* $B^+ \to K^+\,\pi^0$ *decays and isospin analysis of the* $B \to \pi\pi$ *system*, Phys. Rev. Lett. **94**, 181802 (2005) [arXiv:hep-ex/0412037].

[28] B. Aubert *et al.* [BABAR Collaboration], *Measurements of branching fractions and CP-violating asymmetries in B meson decays to charmless two-body states containing a* K^0, Phys. Rev. Lett. **92**, 201802 (2004), [arXiv:hep-ex/0312055].

[29] B. Aubert *et al.* [BABAR Collaboration], *Measurements of the branching fractions of charged B decays to* $K^\pm\,\pi^\mp\,\pi^\pm$ *final states*, Phys. Rev. D *70*, 092001 (2004), [arXiv:hep-ex/0308065].

[30] B. Aubert *et al.* [BABAR Collaboration], *Observation of the decay* $B^0 \to \pi^0\,\pi^0$, Phys. Rev. Lett. **91**, 241801 (2003), [arXiv:hep-ex/0308012].

[31] Farbin, A. *Measurement of CP Asymmetries and Branching Fractions in Neutral B Meson Decays to Charged Pions and Kaons with the BABAR Detector*, SLAC-R-740 (PhD Dissertation).

[32] B. Aubert *et al.* [BABAR Collaboration], *Observation of the decay* $B^\pm \to \pi^\pm\,\pi^0$*, study of* $B^\pm \to K^\pm\pi^0$*, and search for* $B^0 \to \pi^0\,\pi^0$, Phys. Rev. Lett. **91**, 021801 (2003), [arXiv:hep-ex/0303028].

[33] B. Aubert *et al.* [*BABAR* Collaboration], *Measurements of branching fractions and CP-violating asymmetries in* $B^0 \to \pi^+\pi^-, K^+\pi^-, K^+K^-$ *decays,* Phys. Rev. Lett. **89**, 281802 (2002) [arXiv:hep-ex/0207055].

[34] B. Aubert *et al.* [*BABAR* Collaboration], *Study of CP-violating asymmetries in* $B^0 \to \pi^+\pi^-, K^+\pi^-$ *decays,* Phys. Rev. D **65**, 051502 (2002) [arXiv:hep-ex/0110062].

[35] B. Aubert *et al.* [*BABAR* Collaboration], *Measurement of branching fractions and search for CP-violating charge asymmetries in charmless two-body B decays into pions and kaons,* Phys. Rev. Lett. **87**, 151802 (2001) [arXiv:hep-ex/0105061].

Other Publications

[36] B. Aubert *et al.* [BABAR Collaboration], *Measurement of the* $\overline{B}^0$ *lifetime and the* $B^0\overline{B}^0$ *oscillation frequency using partially reconstructed* $\overline{B}^0 \to D^{*+}\ell^-\bar{\nu}_\ell$ *decays*, Phys. Rev. D **73**, 012004 (2006) [arXiv:hep-ex/0507054].

[37] B. Aubert *et al.* [BABAR Collaboration], *Dalitz plot analysis of $D^0 \to \bar{K}^0 K^+ K^-$*, Phys. Rev. D **72**, 052008 (2005) [arXiv:hep-ex/0507026].

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