List Of Beauty 2006 Abstracts

MONDAY

SESSION 1 Triangle status & β

CKM fits
Stephane t'Jampens (LAPP Annecy-Le-Vieux)

An up-to-date profile of the Cabibbo-Kobayashi-Maskawa matrix is given with emphasis on the interpretation of recent results on *CP* violation from the *B* factories. We provide a review of all relevant experimental and theoretical inputs. We give numerical and graphical constraints on the CKM parameters and predictions of related physical observables.

sin(2β) via tree processes & ambiguity removal
Heiko Lacker (BaBar - University of Dresden)

This talk reviews the most recent results from the *B*-meson factories, BABAR and Belle, to constrain the angle β of the unitarity triangle. The parameter sin 2β is obtained from measurements of *CP* violation in the interference between decay with and without mixing in tree-level-mediated quark decays $b \to c\bar{c}s$. The four-fold ambiguity on β can be reduced to a two-fold ambiguity by determining the parameter cos 2β. The sign of cos 2β provides important information on possible New Physics contributions in neutral *B*-meson mixing. Several methods have been proposed in the literature to measure cos 2β and the current experimental status is reviewed.

sin(2β) via penguin processes
Y.Ushiroda (Belle - KEK)

This talk reviews the latest results on time-dependent *CP* asymmetries in $b \to sq\bar{q}$ processes from Belle and BaBar. These decays are dominated by the $b \to s$ gluonic penguin transition and are sensitive to new *CP*-violating phases from physics beyond the standard model. The effective sin $2\phi_1$ (sin 2β) is determined and compared with the sin $2\phi_1$ (sin 2β) measured in $b \to c\bar{c}s$ tree process.

SESSION 2 Triangle sides : B_s mixing & V_{ub}

B_s mixing in D0

Peter Tamburello (University of Arizona)

A combination of $B_s^0 - \overline{B}_s^0$ oscillation results from D0 based on a 1 fb^{-1} data sample is reported. A 95% C.L. lower limit on the oscillation frequency of 15.0 ps^{-1} is set. The corresponding expected limit is 16.5 ps^{-1}. The combined likelihood curve has a preferred value of 19 ps^{-1}, with a 90% C.L. interval of 17—21 ps^{-1}. The probability for a background fluctuation to give a similar result is about 8%.

B_s mixing in CDF

Alberto Belloni (MIT)

We report the latest results on the measurement of the $B_s^0 - \overline{B}_s^0$ oscillation frequency using 1 fb^{-1} of data from $p\overline{p}$ collisions with the CDF II detector at the Fermilab Tevatron. We measure the probability as a function of proper decay time that the B_s decays with the same, or opposite, flavour as its flavour at production, which is determined using opposite-side and same-side flavour identification methods. We find a signal consistent with $B_s^0 - \overline{B}_s^0$ oscillations.

V_{ub} review

Lawrence Gibbons (CLEO - Cornell University)

I present an overview of the experimental determination of $|V_{ub}|$ from inclusive and exclusive B semileptonic decays. The overview will include an introduction to the close interaction between theory and experiment in extraction of $|V_{ub}|$, as well as to some of the experimental techniques brought to bear in the measurements.

SESSION 3 LHC experiments status

ATLAS Detector and Commissioning Status

Helfried Burckhart (CERN)

The status of installation and commissioning of the ATLAS experiment will be presented. This includes some figures about the quality of the detector as installed which are derived from first operational tests. Special emphasis will be put on equipment relevant for B physics.

ATLAS First-Run Scenarios for *B*-physics

Paula Eerola (University of Lund)

The current official start-up plan for the LHC is that the LHC operation will start with a commissioning run in 2007, with proton-proton collisions at the SPS injection energy (450 GeV + 450 GeV) until the end of 2007. The first physics run at the 14 TeV collision energy is foreseen to start in 2008. The aim is to collect a substantial integrated luminosity, typically several integrated fb^{-1}, by the end of 2008. Prospectives for the ATLAS *B*-physics programme with the first LHC runs are presented. The role of *B*-hadron final states during the commissioning run is discussed. Strategies for *B* physics for the first physics run at the design collision energy are presented.

CMS Detector Status

Oliver Buchmuller (CERN)

The status of the construction and installation of the CMS detector is reviewed. Nearly all the mechanical components of the sub-detectors have been assembled at the surface hall SX5. The commissioning phase of CMS has successfully started with the combined slice cosmic challenge and magnet test [MTCC]. The lowering of the detector components in the underground cavern commences this fall.

CMS Commissioning and First Data Scenarios

Frank-Peter Schilling (CERN)

Status and plans for commissioning of the CMS experiment at the LHC, with particular focus on the installation, calibration and alignment procedures of the tracker, calorimeter and muon systems will be discussed. Results and lessons from the recent 'Magnet test and cosmic challenge' will be highlighted. The roadmap for physics commissioning (trigger tables, HLT selection, streaming) and prospects for early physics with CMS will be presented.

LHCb status

Lluis Garrido (University of Barcelona)

LHCb is a dedicated experiment to study *CP* violation and other rare processes in the *B* meson system at LHC. We present here the status of the LHCb experiment with a short introduction on the motivation for the experiment and an overview of the detector design. Installation of the detector components is well advancing and the experiment is expected to be ready for data taking from the beginning of the LHC operation in late 2007.

LHCb first run scenarios including calibration & alignment

Gloria Corti (*CERN)*

Running scenarios for the LHCb experiment in the early operation period of LHC will be discussed in view of the foreseen machine evolution. The strategy for the alignment of the overall detector and for detector calibration will also be shown.

SESSION 4: Production, spectroscopy and lifetimes

Heavy flavour production

Jennifer Pursley (CDF - Johns Hopkins University)

Recent results on heavy flavor production from the CDF and D0 experiments at the Tevatron are reported. Using up to 1 fb^{-1} of accumulated luminosity per experiment, measurements are made of the B hadron relative fragmentation fractions, and production cross sections of the B^+ and Υ. An upper limit for the production cross-section times decay branching fraction for $\eta_b \rightarrow J/\psi\ J/\psi$ is also reported.

B_c and Excited B states Tevatron review

Remi Mommsen (D0 - University of Manchester)

Recent results on heavy flavour spectroscopy from the CDF and D0 experiments at Fermilab will be reported. Using up to 1.1 fb^{-1} of accumulated luminosity per experiment, measurements of the B_c meson, excited B states, and the puzzling $X(3872)$ state will be described.

Branching ratios and lifetimes B_s / Λ_b etc. Tevatron review

Satyajit Behari (CDF - Johns Hopkins University)

We review B_s and Λ_b branching ratio and lifetime measurements from the CDF and D0 experiments at the Tevatron. Employing muon triggers D0 have accumulated large samples of B_s and Λ_b from semileptonic and charmonium decays. CDF, in addition, have employed displaced track trigger to accumulate fully hadronic B_s and Λ_b decays. Using up to 1 fb^{-1} data samples per experiment, Λ_b lifetime in $J/\psi\Lambda$ decays, B_s lifetime difference in K^+K^-, $J/\psi\varphi$ and $D_s^{(*)}D_s^{(*)}$ decays and B_s branching ratios in $D_{s1}\mu\nu$ decays will be reported.

TUESDAY

SESSION 1 Triangle sides : V_{cb} and form factors

V_{cb} & semileptonic form

Elisabeth Barberio (Belle - University of Melbourne)

I will report on the most recent results on the determination of the CKM parameter V_{cb} and semileptonic form factor for the $B \to Dlv$ transition. I will also introduce the theoretical context for the extraction of V_{cb} from inclusive and exclusive analysis. I will comment on the apparent increasing discrepancy of some of the recent results.

Lattice QCD

Christine Davies (University of Glasgow)

I will review recent successes from lattice QCD calculations including the effect of *u*, *d* and *s* sea quarks. In particular I will describe results for decay constants, form factors and mixing amplitudes for *B* mesons.

Charm semileptonic form factors and Decay Constants f_{D+} & f_{Ds+}

Peter Zweber (CLEO - University of Minnesota)

Results for the pseudoscalar decay constants f_{D^+} and $f_{D_s^+}$, from measurements of $D \to \mu\nu$ and $D_s \to \mu/\tau\nu$ decays, respectively, will be presented. Semileptonic form factor results from $D \to$(pseudoscalar)$l\nu$ and $D \to$(vector)$l\nu$ decays will also be presented. While the majority of the presented results are from the CLEO Collaboration, results from the BES, FOCUS, Belle, and BaBar Collaborations will also be discussed.

SESSION 2 Charmless decays & α No.1

Alpha from $B \to \pi\pi$, $\rho\rho$

Jure Zupan (Carnegie – Mellon)

I will review the different methods used to extract α from $B \to \pi\pi$, $\rho\rho$ and $\rho\pi$ that are based on isospin, SU(3) or $1/m_b$ expansion with a special emphasis on the theoretical errors one can expect in different channels.

Measurements of α & future projections
Fabrizio Bianchi (BaBar - University of Torino)

The copious amount of data collected at the *b*-factories has allowed a measurement of the angle α of the Unitarity Triangle in the $B\to\pi\pi$, $B\to\rho\rho$ and $B\to\rho\pi$ decays with an unprecedented precision that will be increased by the doubling of the dataset expected in the next couple of years.

BR and direct *CP* asymmetries of charmless decay modes at the Tevatron
Michael Morello (CDF - University of Pisa)

We present new Tevatron results on Branching Fractions and direct-*CP* time-integrated asymmetries for B^0 and B_s decay modes into pairs of charmless charged hadrons (pion and/or kaon). The data set for this update amounts to 1 fb^{-1} of $p\bar{p}$ collisions, and contains the largest samples currently available for all modes involved.

SESSION 3 Charmless decays & α No.2

$B\to\rho\pi$, $\rho\rho$ and the measurement of α
Patrick Robbe (LHCb - LAL Orsay)

The LHCb experiment is an experiment located at the LHC collider at CERN and which will be dedicated mainly to the study of *B* physics. Thanks to the performances of the LHCb subdectors, precise measurements related to *CP* violation will be possible with the data recorded by the experiment. In particular, using the calorimeter system, neutral reconstruction will give access to the reconstruction of the decay mode $B\to\rho\pi$. Also the large data sample which will be available will allow precise measurements of the $B\to\rho\rho$ decay modes. Both analyses will improve the knowledge of the alpha angle of the CKM triangle with the first data of LHCb.

$B\to h^+h^-$ prospects
Angelo Carbone (LHCb - University of Bologna)

LHCb will collect very large samples of *B*-mesons decaying to charmless two-body final states. The combined measurement of the $B^0\to\pi^+\pi^-$ and $B_s\to K^+K^-$ time-dependent *CP* asymmetries allows to determine the Unitarity Triangle angle γ, up to U-spin flavour symmetry breaking corrections.

We present the status of the LHCb analysis of the charged two-body charmless modes, outlining the event selection, trigger, tagging, particle ID performance and proper time resolution. A study of the LHCb sensitivity on the direct and mixing-induced *CP*-violating parameters A_{CP}^{dir} and A_{CP}^{mix} is then performed, and the final LHCb sensitivity to the gamma angle measurement using these decay modes is estimated.

Hadronic *B* decays

Martin Beneke (University of Aachen)

I summarize the various theoretical frameworks for hadronic *B* decays with emphasis on calculational frameworks and new theoretical results that have become available recently. I examine how these results affect the description of data and discuss a few selected features of the data that shed light on CKM parameters or hadronic dynamics.

WEDNESDAY

SESSION 1: γ measurements

γ from *DK*
Jure Zupan (Carnegie Mellon)

I will review the methods for extracting gamma from $B \to DK$ decays with a special emphasis on the theoretical errors.

Measurements of γ & future projections (Dalitz analysis)
Karim Trabelsi (Belle – KEK)

Recent results on the Cabibbo-Kobayashi-Maskawa *CP*-violating phase γ using a Dalitz plot analysis of neutral *D*-meson decays to the $K^0_S\pi^+\pi^-$ final state from $B^\pm \to D^{(*)}K^\pm$ and $B^\pm \to DK^{*\pm}$ decays will be reported. These measurements are obtained at the BaBar and Belle e^+e^- experiments. Future projections will be also given.

Measurements of γ & future projections (ADS, GLW etc)
Marco Zito (BaBar - DAPNIA/Saclay)

On behalf of the Babar and Belle collaborations, results of analyses aimed at measuring the γ angle of the CKM unitarity triangle will be presented. This includes results obtained with the Gronau-London-Wyler and Atwood-Dunietz-Soni methods studying $B \to DK$ decays as well as several analyses sensitive to the CKM combination of angles $2\beta+\gamma$. The dataset consists of 232 (386) M $B\overline{B}$ decays for the BaBar (Belle) experiment. Prospects for these analyses with an increased integrated luminosity will also be discussed.

Gamma from *B→DK* strategies
Yuehong Xie (LHCb - University of Edinburgh)

The most promising way to determine the γ angle of the CKM unitarity triangle is through the tree level processes $B \to DK$. The LHCb collaboration has studied these types of decay using the GLW, ADS and Dalitz methods based on a large sample of simulation data. The expected sensitivities to the angle γ in each method are summarized in this report.

SESSION 2: Leptonic *B* Decays and Charmonium States

Leptonic and semileptonic decays; hadronic parameters

Gil Paz (IAS, Princeton)

The last two years saw an impressive improvement in the determination of V_{ub}, especially from inclusive decays. The error on inclusive V_{ub} was reduced from 18% (PDG 2004) to 8% (PDG 2006). This progress is a result of a combined experimental and theoretical efforts. In this talk, I will review the theoretical framework (BLNP) that enabled such progress, as well as other approaches to inclusive determination of V_{ub} (DGE, M_x-q^2 etc.). I will also discuss the prospects of improving on V_{ub}, addressing issues of weak annihilation, implications of leptonic *B* decays, and exclusive determination of V_{ub}.

Time-integrated asymmetry in semileptonic *B* decays in D0

Elliott Cheu (University of Arizona)

We have measured the time-integrated charge asymmetries in dimuon events and semileptonic B_s decays. These results are the most precise semileptonic charge asymmetries in *B* decays to date.

We combine these results with measurements from the decay $B_s \rightarrow J/\psi\varphi$ to determine the *CP*-violating phase ϕ_s. We find $\phi_s = -0.56^{+0.44}_{-0.41}$.

New charmonium-like states

Bruce Yabsley (Belle - University of Sydney)

In recent years the *B*-factories and other machines have found evidence for a large number of new states with hidden charm: candidate h_c(1P), η_c(2S), and χ_{c2}(2P) states; the well-established X(3872); enhancements called X(3940), Y(3940), and Y(4260); and a new structure at 4350 MeV. Various conventional-charmonium and more exotic interpretations of these data have been proposed. In this talk we review the current state of the experimental evidence and the prospects for clarifying the spectrum.

THURSDAY

SESSION 1: Triggers

CDF: *B* physics performance & trigger – operational experience

Alberto Annovi (INFN Frascati)

The upgraded Collider Detector at Fermilab (CDF II) has the capability to trigger on displaced tracks. This capability is essential for CDF's word class *B* physics measurements. We will review the features of the CDF trigger most relevant for *B* physics analyses. In particular the talk will cover trigger architecture, principles, performance, upgrades and special features.

D0: *B* physics performance & trigger – operational experience

Daniela Bauer (Imperial College)

The replacement of the D0 tracking system as part of the RunII upgrade enabled D0 to successfully pursue a large and varied *b*-physics programme. This talk discusses some of the challenges encountered when doing *b*-physics at a hadron collider, with emphasis on trigger strategies.

B triggers – ATLAS and CMS

Julie Kirk (ATLAS – RAL)

This talk describes the *B*-physics trigger systems for the ATLAS and CMS experiments. The LHC will produce *B* events at an unprecedented rate allowing the possibility to study rare decays. Due to the high event rate at the LHC the trigger systems are required to be very selective, reducing the rate by about six orders of magnitude for recording. The *B*-trigger must be able to reject the non-*B* background (only about one collision in a hundred will produce a $b\bar{b}$ pair) and select the *B*-decay channels of specific interest (often with low branching ratios). In addition the *B*-trigger must be flexible enough to cope with increasing luminosity during the period of LHC running. The different strategies used to achieve this flexibility are covered by this talk.

LHCb trigger system

Eduardo Rodrigues (NIKHEF)

The LHCb detector is designed to study with high precision rare decays of and *CP* asymmetries in *b*-flavoured hadrons produced at the LHC. Though the LHC luminosity is large, the *b*-production cross section is less than 1% of the total inelastic cross section. Also the branching ratios of typical *b*-decays of interest are rather small, often below 10^{-4}. The LHCb trigger is of crucial importance in selecting among the bulk of collisions those that are of interest for *b*-physics studies. It is based on a 2-level system. The first level, Level-0, is implemented in hardware and uses information from the calorimeter, muon and pile-up systems to select events containing particles with relatively large transverse momentum, typically above 1-2 GeV. The Level-0 trigger accepts events at a rate of 1 MHz. All the detector information is then read out and fed into the High Level Trigger. This software trigger runs in the event filter farm composed of about 2000 CPUs. Algorithms separated in dedicated trigger streams exploit the Level-0 triggering information and refine the selection using both the tracks high transverse momenta and large impact parameters characteristic of *b*-decays. Events are selected at a rate of 2 kHz and sent for mass storage and subsequent offline reconstruction and analysis. The current status and expected performance of the trigger system are described.

SESSION 2: Rare decays & new physics No.1

Rare decays as a probe of new physics

Tobias Hurth (CERN)

We discuss the various opportunities in the indirect search for new Physics offered by rare *B* decays. We focus on $b \to s$ transitions.

Radiative and EW penguins (including $K^* \mu^+ \mu^-$)

Jeff Richman (Babar - UC Santa Barbara)

Radiative and electroweak penguin decays of *B* mesons are rare processes that involve flavor-changing neutral currents. Because these decays are forbidden at tree level in the Standard Model, they provide powerful ways to search for the effects of new particles that may enter virtually in loop or box diagrams.

I describe recent results from the BaBar and Belle e^+e^- experiments on both exclusive and inclusive decays using a wide variety of observables. Due to their relative simplicity, some of the decay processes also provide valuable information on CKM matrix elements, quark masses, and parameters describing non-perturbative QCD interactions.

Rare decays $B \to l\nu$, ll, $ll\gamma$

Koji Ikado (Belle - Nagoya University)

This talk reviews the most recent results on $B \to \tau\nu$, $l\nu$, ll, and $ll\gamma$ from the B-meson factories, BABAR and Belle. The first measurement of the B meson decay constant at Belle is also presented.

SESSION 3: Rare decays & new physics No.2

$B \to \mu\mu$ limits CDF/D0 review

Cheng-Ju Lin (CDF - Fermilab)

The flavour-changing neutral current decay $B_{s(d)} \to \mu^+\mu^-$ is one of the most sensitive probes to physics beyond the Standard Model. The predicted branching ratio in the Standard Model is on the order of $\sim 10^{-9}$ (10^{-10}) for B_s (B_d), which is beyond the sensitivity of the current experiments. However, in many extensions of the Standard Model, the branching ratio is naturally enhanced by one to three orders of magnitude and thus would be observable at the Tevatron. In this talk, I will review issues relevant to rare decay searches in the hadron environment and present the status of the $B_{s(d)} \to \mu^+\mu^-$ analyses at the Tevatron.

Review of Searches and Prospects for Leptonic Rare B Decays

Maria Smizanska (ATLAS - University of Lancaster)

The LHC experiments will perform sensitive tests of physics phenomena beyond the Standard Model (BSM). Investigation of decays of beauty hadrons represents an alternative approach in addition to direct BSM searches. The efforts concentrate especially on the rare B decays sector. In family of semi-muonic rare decays, including B_d, B_s and Λ_b channels, LHC will be able unambiguously to confirm or exclude certain classes of MSSM models in confrontation with SM already after one year. The strategy is to carry on the di-muon channel programme up to nominal LHC luminosity. In particular, for the $B \to \mu\mu$ channel, a branching fraction sensitivity up to few times 10^{-10} is expected to be achieved already after one year of LHC operation at a luminosity of $10^{34} \mathrm{cm}^{-2}\ \mathrm{s}^{-1}$. This precision allows excluding or confirming the SM unambiguously.

Rare decays, radiative review

Stefano De Capua (LHCb - Rome II Tor Vergata)

Rare loop-induced decays are sensitive to New Physics in many Standard Model extensions. In this talk we discuss the potentialities of the LHCb experiment to study the radiative penguin decays $b \to s\gamma$ and the electroweak penguin decays $b \to lls$. The experimental strategies are presented.

SESSION 4 B_s physics

B_d and B_s mixing: mass and width differences and *CP* violation

Uli Nierste (Karlsruhe University)

$B^0 - \overline{B}^0$ mixing involves three physical parameters: the off-diagonal elements of the mass and decay matrices and their relative phase. They are related to the mass and width differences between the mass eigenstates and to the asymmetry which quantifies *CP* violation in mixing. I present an update of the theory predictions for these quantities in the Standard Model and discuss how various present and future measurements can be combined to constrain new physics.

ϒ(5S): What has been learned and what can be learned

Steve Blusk (CLEO - Syracuse University)

The ϒ(5S) resonance, first discovered more than 20 years ago, is above threshold for producing B_s pairs, and thus can be exploited to learn more about B_s decays and their potential for future CKM physics. The speaker will present some of the physics accessible to a *B* factory running at the ϒ(5S) and discuss recent results from the data samples that have been collected by CLEO and BELLE.

$B_s \to J/\psi\phi$ update, lifetime difference and mixing phase

Avdhesh Chandra (D0 - UC Riverside)

In this talk we present the status of untagged decay of $B_s \to J/\psi\phi$ study, which have been done at CDF and D0 detectors at Fermilab. In the standard model (SM), the light (L) and heavy (H) eigenstates of the mixed $(B_s^0, \overline{B}_s^0)$ system are expected to have a sizable mass and decay with difference, $\Delta M \equiv M_H - M_L$ and $\Delta\Gamma \equiv \Gamma_H - \Gamma_L$. The *CP* violating phase, $\delta\phi$, defined as the relative phase of the off-diagonal elements of the mass and decay matrices in the $B_s^0, \overline{B}_s^0$ basis is predicted to be small, and to a good approximation the two mass eigenstates are expected to be *CP*-eigenstates. Through a study of the time-dependent angular distribution of the decay products of the J/ψ and ϕ mesons, it is possible to separate the two *CP* components of the decay $B_s \to J/\psi\phi$, and thus measure the lifetime difference, and the *CP* violating phase.

From a simultaneous fit to the distributions in the B_s candidate mass, proper decay length, and three angles of the decay products, the CDF collaboration obtain the average lifetime of the $B_s^0, \overline{B}_s^0$ system, $\bar{\tau}(B_s^0) = 1.39^{+0.15}_{-0.13}(stat) \pm 0.02(syst)$ ps and $\Delta\Gamma = 0.47^{+0.19}_{-0.24} \pm 0.01$ ps^{-1}. D0 measures $\bar{\tau}(B_s^0) = 1.49 \pm 0.08 \pm 0.02$ ps and $\Delta\Gamma = 0.17 \pm 0.09 \pm 0.03$ ps^{-1} and $\delta\phi$=-0.79±0.56±0.01. With an additional constraint from the charge asymmetry in B_s semileptonic decays, D0 measures $\Delta\Gamma = 0.15^{+0.09}_{-0.08} \pm 0.03$ ps^{-1} and $\delta\phi = -0.56^{+0.44}_{-0.41} \pm 0.01$.

These results are consistent with SM predictions within the measurement uncertainties. The data sample corresponds to an integrated luminosity of 1.0 fb^{-1} and 260 pb^{-1} accumulated with the D0 detector and the CDF detector respectively at the Tevatron.

ϕ_s from $J/\psi\phi$ (LHC review)

Nicolo Magini (CMS - Università di Firenze)

Analysis of the angular distributions of the final products of the $B_s \to J/\psi\phi \to l^+l^- K^+K^-$ decay chain allows the determination of B_s mixing parameters, in particular the width difference $\Delta\Gamma_s$ which is at present not precisely measured. It also allows to measure the *CP*-violating phase ϕ_s of the B_s system, which is expected to be very small (~0.03) in the Standard Model but might show large non-SM enhancements. The high production rate of B_s mesons at the LHC will permit precise measurements of these quantities; the performances of the three LHC experiments with a *B*-physics programme (ATLAS, CMS and LHCb) in the reconstruction and analysis of this decay will be presented.

FRIDAY

SESSION 1: Flavour physics beyond the B-sector

Charm Mixing & *CP* Violation review

David Asner (CLEO - Carleton University)

The phenomenology of $D^0 - \bar{D}^0$ mixing and *CP* violation is briefly described. Recent experimental results from Babar, Belle, and CLEO-c are reviewed. No evidence for mixing or *CP* violation is found, and limits are set for the mixing parameters *x*, *y*, *x'*, *y'*, and several *CP*-violating parameters. Results are compared to theoretical predictions.

Finally, future prospects at BES-III, LHCb and a Super *b*-factory are discussed.

Hadronic Charm Decays

Henry Band (BaBar - University of Wisconsin)

The *B* factory detectors BaBar and Belle continue to find new charmed mesons and baryons and to refine mass and width measurements. These studies and recent precision measurements of *D* decays to non-charm final states will be reviewed.

Charm Physics at LHCb

Raluca Muresan (LHCb - University of Oxford)

The LHCb experiment has an exciting potential for charm physics studies. A dedicated D^* trigger will provide a very large sample, 10^8 events per 2 fb^{-1} of flavour tagged $D^0 \to hh$ decays, which will give unprecedented sensitivity in searches for D^0 mixing and *CP* violation. The same sample provides an invaluable calibration signal for LHCb performance, in particular the RICH detector. This programme will be described, and initial Monte Carlo studies presented.

Charm studies at CDF

Burkard Reisert (FNAL)

The upgraded Collider Detector at Fermilab (CDF II) has the capability to trigger on displaced tracks. This capability in conjunction with the unprecedented integrated luminosity in excess of 1 fb^{-1} opens a window of opportunity for detailed studies of charm hadron production.

CDF is now releasing first measurements of the prompt charm meson pair cross sections, which give access to QCD mechanisms by which charm quarks are produced in proton anti-proton collisions.

Recent results on the spin alignment of J/ψ and $\psi(2S)$ as well as on the relative production of the $\chi_{c1}(1P)$ and $\chi_{c2}(1P)$ challenge our understanding of the fragmentation of charm quarks into charmonium states.

SESSION 2: Experimental systematics

CDF / D0: Flavour tagging, including calibration & control

Tania Moulik (D0 - University of Kansas)

B flavour tagging is essential for analyses which require identification of the flavour of a neutral *B* meson at production, whether it comprised of a *b*-quark meson or an a $\bar{b}$ quark meson. Flavour tagging is used in B_d and B_s mixing measurements, and *CP* violation studies. The flavour tagging at Tevatron, which is a hadron collider, is difficult due to large background and underlying events. Various techniques, like neural network and likelihood methods are therefore used to identify the flavour of the neutral *B* meson.

The decision from various methods is combined and the B_d mixing measurement is performed to check the flavour tagger and do the tagger calibration for taggers which rely on decay products of the opposite *B* meson. Taggers which rely on fragmentation tracks around the produced *B* meson, are calibrated separately for B_s and B_d mesons. The calibration provides an optimal tagger performance on an event basis. The techniques developed at CDF and D0 experiments at Tevatron, and its calibration using B_d and B_s decay samples is discussed.

LHCb: Flavour tagging, including calibration & control

Hugo Ruiz (University of Barcelona)

In the first part of the presentation, the different tagging algorithms that have been designed for the LHCb experiment will be described, as well as the procedure for the combination of several tags present in a single event. The expected performance from the algorithms based on MC studies will then be shown.

The second part of the presentation will describe the calibration of the tagging procedure: it will be demonstrated that MC simulation is not capable of providing the precision needed on the mistag probability for the precise measurements expected in LHCb. It will then be explained how LHCb plans to obtain the calibration from data, by the use of control channels. It will be shown how to overcome the sizeable differences on mistag probability between control and signal channels, caused by different offline and trigger selections, which presents the main difficulty to the method.

SESSION 3: The future & summary

LHCb upgrade plans

Franz Muheim (University of Edinburgh)

The baseline plans of the LHCb experiment are to operate for five years at a luminosity of 2×10^{32} $cm^{-2}s^{-1}$ and to accumulate a data sample of 10 fb^{-1}. Here we discuss the physics programme and detector design for a future high luminosity phase of the LHCb experiment. The upgraded LHCb experiment will operate at a luminosity which is an order of magnitude higher. The aim is to collect a data sample of the order of 100 fb^{-1} over a five year period. This programme would allow a detailed investigation of the New Physics if it were observed at the LHC. The most important measurements will include the B_s mixing phase ϕ_s which is very small in the Standard Model, a very precise determination of the CKM angle γ in tree diagram decays. In flavour changing neutral currents, New Physics can be probed in the weak mixing phase of $B_s\rightarrow\phi\phi$ decays with a precision of a few degrees. New Physics can also be studied in very rare B decays such as $B_d\rightarrow K^*\mu^+\mu^-$ and $B_s\rightarrow\mu^+\mu^-$. Initial studies of the required modification to the LHCb trigger and detectors will be presented. The upgrade LHCb experiment will not require modifications to the LHC.

Future *B* factories: SuperBelle and new ideas on Recirculating Linacs

Adrian Bevan (Queen Mary College, London)

Some of the physics topics accessible to an e^+e^- flavour factory are discussed, including the possibilities to perform detailed studies of the CKM mechanism of quark mixing, and constrain virtual Higgs and non-standard model particle contributions to the dynamics of rare *B* decays. The ample samples of *D* meson and τ lepton decays at a flavour factory can result in improved sensitivities on *D* mixing and lepton flavour violation searches. Recent developments accelerator physics concepts that can provide the necessary luminosity for such an experiment are discussed.

Conference Summary & Future Prospects

Tim Gershon (University of Warwick)

The status of *B* physics, *CP* violation and related measurements at the time of the Beauty 2006 conference are summarized. Particular attention is given to the exciting prospects that lie ahead, at the commencement of the LHC era, and beyond.