$\boldsymbol{B}$ PHYSICS IN CDF*

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The upgraded CDF detector is now collecting data with the aim of integrating 2 fb^{-1} by year 2005. The pursued B physics program is very appealing. CDF will provide measurements of various CP violating and B mixing parameters which both complement and extend B-factories measurements. In addition there is a variety of spectroscopy measurements on B_s and heavier B hadrons which are currently accessible only at the Tevatron. In this talk we give a description of the new CDF tools available for B physics, we discuss the preliminary results obtained with the first 70 pb^{-1} of data, and we highlight Run II B physics prospects.

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1. Introduction

CDF is a full purpose detector at the Tevatron $p\bar{p}$ collider at Fermilab. The data collected during Tevatron Run I (110 pb^{-1} at $\sqrt{s} = 1.8$ TeV) in the years 1992–96 produced many important results in the B physics field, among which the first $\sin(2\beta)$ measurement [1], $B_d^0 - \bar{B}_d^0$ mixing [4] and the B_c observation [5]. The Tevatron accelerator complex has now been renovated to reach an higher luminosity and a slightly higher center of mass energy (1.96 TeV). CDF has been consequently upgraded and since March 2001 is back in operation for the so called Run II.

The renovated accelerator complex has a new injection stage (Main Injector) for a more efficient p and $\bar{p}$ production and transfer to the Tevatron ring. The inter-bunch spacing has been reduced from 3500 to 396 ns, and the number of counter-rotating bunches has been increased from 6×6 to

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36×36 aiming for an instantaneous peak luminosity of $5 - 8 \times 10^{31} \mathrm{cm}^{-2}\mathrm{s}^{-1}$ and $1.0 - 1.6$ average number of collisions per bunch crossing. A *recycler* ring for improved antiprotons production is being commissioned, it should be operational in 2004 and further increase the instantaneous luminosity to $10–20 \times 10^{31} \mathrm{cm}^{-2}\mathrm{s}^{-1}$.

The Tevatron instantaneous peak luminosity (currently $4 \times 10^{31} \mathrm{cm}^{-2}\mathrm{s}^{-1}$) is still below planned values, however it has increased steadily and we expect further improvements soon. At the time of writing these proceedings CDF on-tape luminosity amounts to 130 pb^{-1} of which 70 pb^{-1} have been analyzed for the results shown herein. The plan is to reach 300 pb^{-1} by October 2003. Long term run plans consist of collecting $1 - 2$ fb^{-1} by 2005 (Run IIa), and subsequently (Run IIb) additional $5 - 10$ fb^{-1} by 2008 or before starting of LHC.

Studying B physics at hadron colliders such as the Tevatron, has with respect to B-factories, the great advantage that all B species are produced (B_d, B_u, B_s, B_c, Λ_b, and heavier hadrons) and with a considerably higher cross section (~ 100 μb compared to few nb). The challenge is to disentangle the interesting events from the one thousand larger background of inelastic $p\bar{p}$ collisions ($\sigma_{\mathrm{inelastic}}(\bar{p}p) \simeq 50$ mb).

Using Run I data the CDF experiment has shown that exclusive B channels can be successfully selected and reconstructed in the harsh hadron environment. The new CDF detector has been made even more powerful in this respect thanks also to a more precise and extended tracking system, the additional capability of triggering on displaced vertices, and increased particle identification capabilities.

The CDF II B physics potential is great, giving access to a variety of B measurements, such as CP violation and mixing in both the B_d^0 and B_s^0 sectors, precise measurements of B hadron masses, lifetimes and branching ratios. Overall the Tevatron data will help constraining the Standard Model and possibly provide evidence for new physics.

2. The upgraded CDF detector

The CDF II detector [6] is shown in figure 1. Very little has been inherited from Run I: the central calorimeter, part of the muon detectors, and the 1.4 T solenoid. The muon system has been extended to fully cover down to 1.5 pseudo-rapidity. The old plug and forward calorimeters have been replaced with a faster and finer segmented scintillator tile-fiber calorimeter. Cerenkov counters at small angles provide a precise luminosity monitor.

Proceeding toward the interaction point, just internally to the solenoid, there is a completely new time of flight detector (TOF) with 100 ps design time resolution for 2.0 sigma kaon-pion separation of tracks below 1.6 GeV/c.

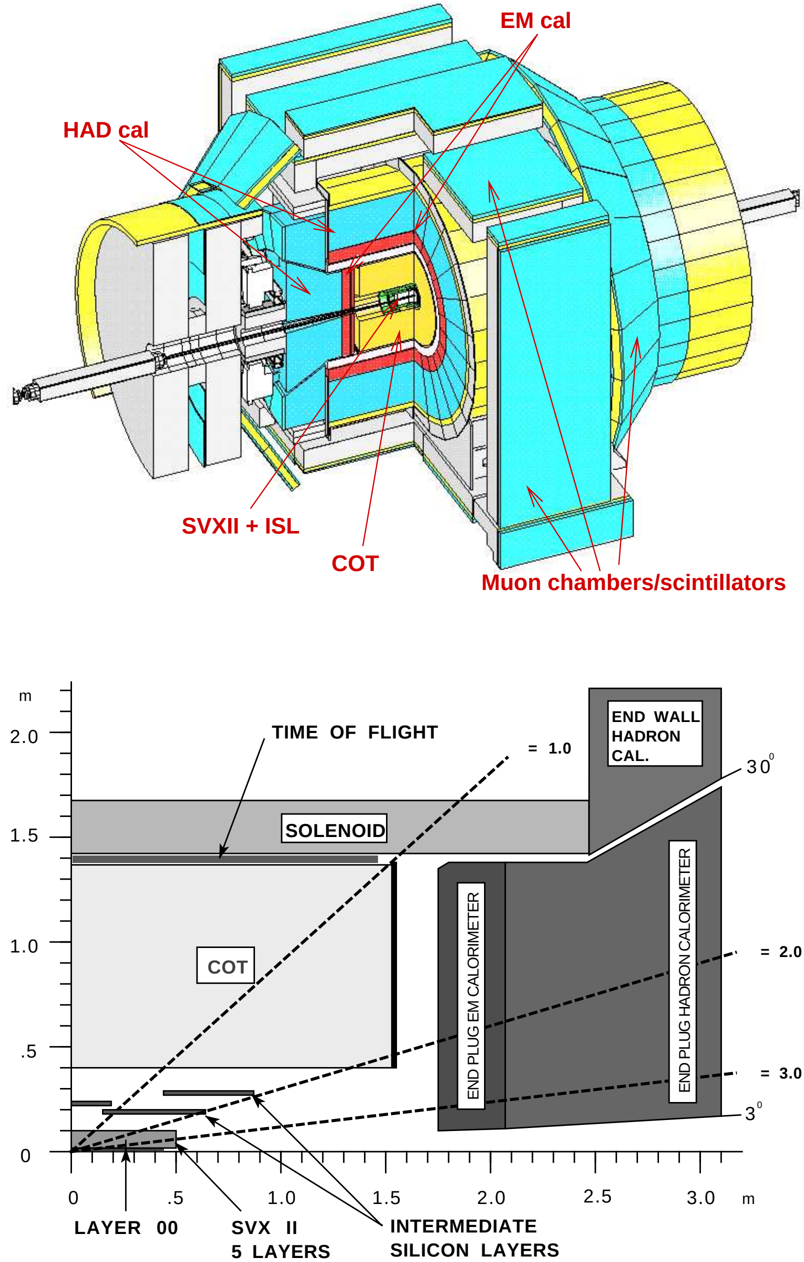

Fig. 1. Schematic draw of the CDF Run II detector (top) and side view of one quarter of the tracking system (bottom).

Initial performance is already close to design [7]. A large radius ($r = 1.4$ m) drift chamber (COT) follows, for precise 3D-tracking and momentum measurement above 400 MeV/c in the central volume ($|\eta| \leq 1$). It also provides dE/dx information useful for particle identification. Between 30 and 3 cm from the beam line SVX-II and ISL detectors together consist of 6–7 (depending on η) layers of double sided silicon strips, they provide very precise standalone 3D-tracking down to 2.0 pseudo-rapidities. Finally, one additional layer of radiation-hard silicon detector (Layer00, still being commissioned) wraps around the beam pipe ($r = 1.5$ cm) and can further improve vertexing of low momentum tracks.

A completely new 3-level trigger system fulfills the challenging task of reducing the 5 MHz $p\bar{p}$ interaction rate down to 50 Hz suitable for disk/tape storage. Fast tracking is now available at level 1 thanks to the XFT processor which reconstructs COT tracks ($P_{\rm t} \geq 1.5$ GeV/c) in the plane transverse to the beam line. At level 2 the SVT processor associates XFT tracks with hits in the silicon detectors providing very precise reconstruction of tracks with transverse momentum above 2 GeV/c.

The trigger system is performing well, dead time is usually well below 10%. XFT track resolution ($\Delta P_{\rm t}/P_{\rm t}^2 = 1.65\%$ GeV^{-1}, $\Delta\phi = 5$ mrad) is even better than design. SVT is performing within specifications [8] with a track impact parameter[1] resolution less than 50μm (which includes a $\sim$ 30μm transverse beam size).

3. Trigger strategies

In Run I CDF B physics relied on lepton-based triggers of which the main two were: a *di-muon trigger* requiring two oppositely charged muons with $P_{\rm t}$ above 2 GeV/c, for collecting J/ψ inclusive samples; a *single high-$P_{\rm t}$ lepton trigger* (e or μ above 8 GeV/c) designed, in the first place, for top quark physics, this trigger collected samples enriched with B charmed semi-leptonic decays.

The di-muon trigger is now enhanced because of the reduced and more effective $P_{\rm t}$ threshold (now 1.5 GeV/c, thanks to XFT) and the increased detector acceptance for leptons. A large clean $J/\psi \to \mu^+\mu^-$ sample (550K signal events in 72 pb^{-1}) has been collected and used for precise track momentum calibration and preliminary B lifetime measurements. A *di-electron trigger* has been added to collect $J/\psi \to e^+e^-$.

Lepton based triggers however suffer of low branching ratio and not fully reconstructed final states due to the presence of an undetected neutrino. CDF II B physics program relies mostly on a completely new kind of trigger based on the selection of *displaced tracks*, *i.e.* tracks with large impact

[1] *Impact parameter* is the minimum transverse distance from the primary interaction vertex to the extrapolated track.

parameter with respect to the beam line. This new trigger is made possible by the very precise on-line track reconstruction provided by the SVT. It exploits the fact that at the Tevatron B hadrons usually travel a distance $L_{xy} \geq 500$ μm before decaying, therefore secondary vertices are significantly displaced and tracks have large impact parameter (d_0) typically above $100\,\mu$m.

We currently have two implementations of displaced track triggers. One is the *lepton + displaced track trigger*. It requires one muon or electron ($P_t \geq 4$ GeV/c) and one displaced track ($d_0 \geq 100$ μm, $P_{\rm t} \geq 2$ GeV/c). The collected sample is enriched in semi-leptonic B decays. Its primary application is to provide an unbiased large statistics sample for B flavour taggers optimisation and B lifetimes measurements in semi-leptonic decay modes. The other one is the so called *hadronic trigger*. It requires basically two oppositely charged tracks with $d_0 \geq 100$ μm and $P_{\rm t} \geq 2$ GeV/c. It is designed to efficiently select fully hadronic B decays either in two charged hadrons (as $B_d^0 \to \pi^+\pi^-(K^+\pi^-)$, $B_s^0 \to K^+K^-(K^-\pi^+)$, $\Lambda_b^0 \to p\pi^-(pK^-)$) or multibody decays (as $B_s^0 \to D_s^-\pi^+(D_s^-\pi^+\pi^-\pi^+)$) plus a lot of prompt charm decays[2].

4. Hadronic trigger performance

The hadronic trigger data sample is extremely rich in charmed mesons decays, in fact $D^0 \to K^+\pi^-$ decays are reconstructed on-line and used to monitor the trigger performance (figure 2).

Using the first 10 pb^{-1} of data we measured the relative branching fractions of Cabibbo-suppressed decays $D^0 \to K^+K^-(\pi^+\pi^-)$:

$$\begin{aligned} \mathrm{BR}(D^0 \to KK)/\mathrm{BR}(D^0 \to K\pi) &= 11.17 \pm 0.48(\mathrm{stat}) \pm 0.98(\mathrm{syst})\%\,, \\ \mathrm{BR}(D^0 \to \pi\pi)/\mathrm{BR}(D^0 \to K\pi) &= 3.37 \pm 0.20(\mathrm{stat}) \pm 0.16(\mathrm{syst})\%\,. \end{aligned}$$

The precision of these measurements is already competitive with CLEO II results [9] obtained with a similar technique at the $\Upsilon(4\mathrm{S})$ with ≈ 10 fb^{-1} integrated luminosity.

With the same sample we have also performed a measurement of the mass difference between D_s^+ and D^+ mesons reconstructed in their $\phi\pi$ decay mode (figure 3):

$$m_{D_s^+} - m_{D^+} = 99.41 \pm 0.38(\mathrm{stat}) \pm 0.21(\mathrm{syst})\ \mathrm{MeV}/c^2$$

which agrees with world average (99.2 ± 0.5 MeV/c^2) and has a comparable uncertainty. This measurement, besides being the first CDF II published result [11], is an important benchmark in understanding our ability to set the mass scale.

[2] Throughout this paper for all the decays also the charge conjugate is implied.

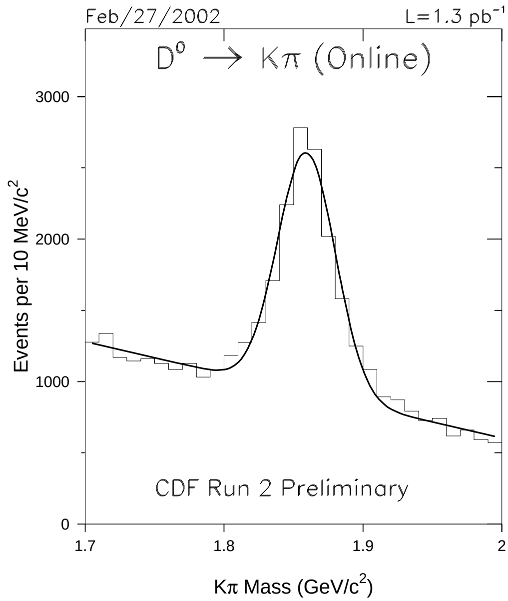

Fig. 2. $D^0 \to K^+\pi^-$ reconstructed on-line in 1.3 pb^{-1} of integrated luminosity.

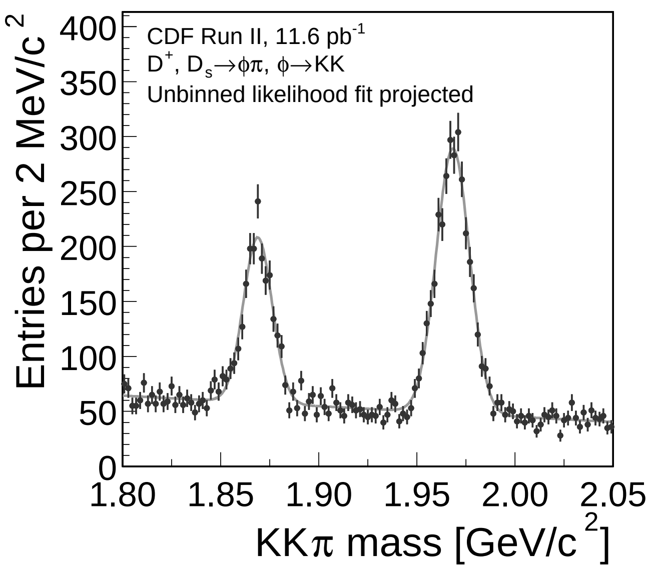

Fig. 3. Measured $K^+K^-\pi^+$ mass distribution compared to the unbinned likelihood fit used for D_s^+, D^+ mass difference measurement.

A relevant fraction of these charmed mesons reconstructed in hadronic trigger data is actually from B hadrons. We have measured this fraction separately for D^0, D^+, D^{*+} and D_s^+ using the impact parameter of the reconstructed D meson to discriminate between prompt and charm mesons from B. The B fraction ranges from 11% to 35% depending on the D flavour (figure 4).

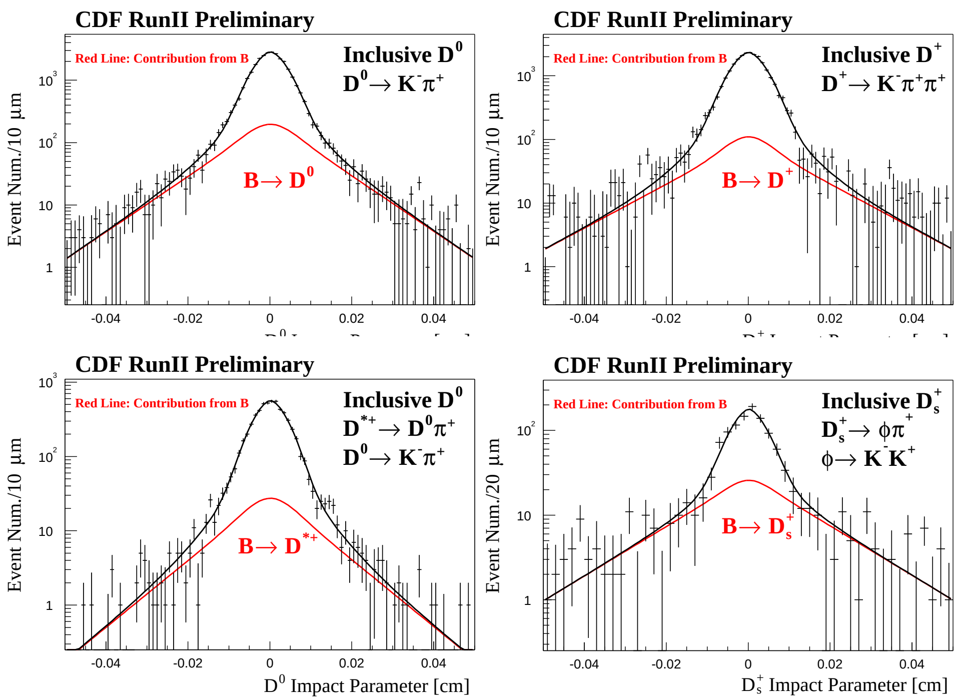

Fig. 4. Impact parameter of D mesons reconstructed in 10 pb^{-1} of hadronic trigger data. Prompt D tracks point back to primary vertex and their impact parameter is null within resolution, on the contrary secondary D tracks are significantly displaced. The fit produces the inclusive fraction of D mesons from B decays: 16.4±0.7 % for $D^0 \to K\pi$, 11.3±0.5% for $D^+ \to K\pi\pi$, 11.4±1.4% for $D^{*+} \to D^0\pi$, 34.8 ± 2.8 % for $D_s \to \phi\pi$.

5. Preliminary results and prospects

In the following we briefly summarise the main B physics topics within the CDF reach using the first 2 fb^{-1} of data [12], and we report on the very first steps toward the new measurements.

5.1. *B masses*

We have preliminary results on masses of B mesons of all flavours reconstructed in exclusive J/ψ channels (figure 6). As a prerequisite to this measurement the track momentum scale was precisely set (figure 5) using the inclusive J/ψ sample and further checked on other known signals as D^0 and Υ which cover the mass range of interest.

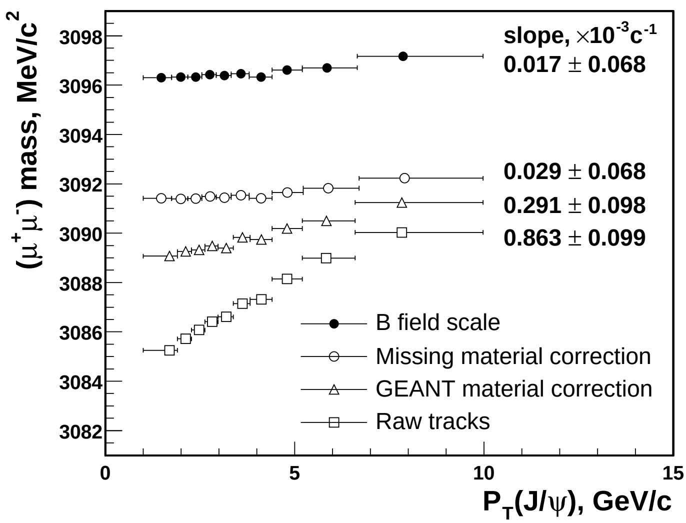

Fig. 5. Material and magnetic field calibration using ∼500K $J/\psi \to \mu^+\mu^-$.

Although statistics is still limited, measured values compare well with world averages (Table I). Competitive mass values especially for B_s and Λ_b can be expected soon.

TABLE I

Preliminary B masses, with 20 pb^{-1}. The first quoted error is statistical, second is systematic.

	Mass(MeV/c^2)	$(M_{\rm CDF} - M_{\rm PDG})$ (MeV/c^2)	$\sigma_{\rm CDF}/\sigma_{\rm PDG}$
B^+ ($\to J/\psi K^+$)	5280.6±1.7±1.1	+0.8	4.0
B^0 ($\to J/\psi K^{*0}$)	5279.8±1.9±1.4	+0.2	4.8
B_s ($\to J/\psi \phi$)	$5360.3 \pm 3.8^{+2.1}_{-2.9}$	−2.1	1.9

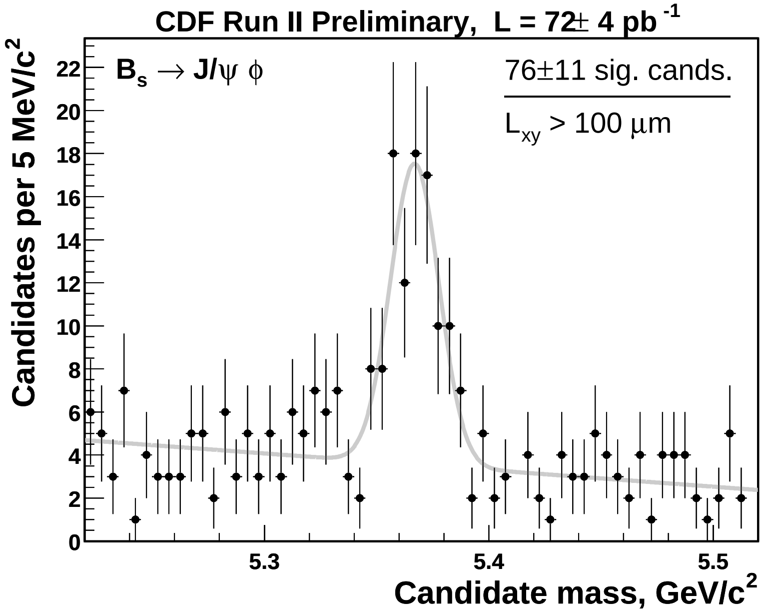

Fig. 6. Mass distribution of $B_s^0 \to J/\psi\phi$ ($\phi \to K^+K^-$) candidates.

5.2. B lifetimes

A lifetime measurement is essentially a measurement of the distance between the decay vertex and the primary vertex (L_{xy}) corrected by the Lorentz boost of the decaying B hadron: $c\tau = L_{xy}/(\gamma\beta)$, $\gamma\beta = P_t(B)/M(B)$. Therefore, a precise secondary vertex reconstruction is crucial. This was made possible already in CDF I by the previous silicon vertex detector (SVX-I). CDF I performed a full set of precise lifetime measurements, in particular CDF has made the only existing measurement of B_c meson lifetime (0.46 ± 0.17 ps) and the most accurate single experiment measurement of B_s (1.36 ± 0.10 ps) and Λ_b (1.32 ± 0.17 ps) lifetimes. In Run II we expect a factor of 50 larger statistics (2 fb^{-1}, wider silicon and lepton coverage, effective hadronic triggers) and competitive lifetime measurements ($\sigma(\tau) \approx$ 0.01 ps) especially for heavy states: B_s, B_c, Λ_b.

Preliminary B mesons lifetime measurements in J/ψ exclusive decay modes, based on 72 pb^{-1} of data are listed in Table II. Although statistics is still limited, systematics are already well under control. Figure 7 shows the lifetime fit for our $B_s^0 \to J/\psi\phi$ candidates.

TABLE II

Preliminary B lifetimes, with 72 pb^{-1}. The first quoted error is statistical, second is systematic.

	$\tau(ps)$	$(\tau_{\rm CDF}-\tau_{\rm PDG})$ (ps)	$\sigma_{\rm CDF}/\sigma_{\rm PDG}$
B^+ $(\to J/\psi K^+)$	1.57±0.07±0.02	−1.4	4.1
B^0 $(\to J/\psi K^{*0})$	1.42±0.09±0.02	−1.3	5.7
B_s $(\to J/\psi\phi)$	1.26±0.20±0.02	−1.0	3.5

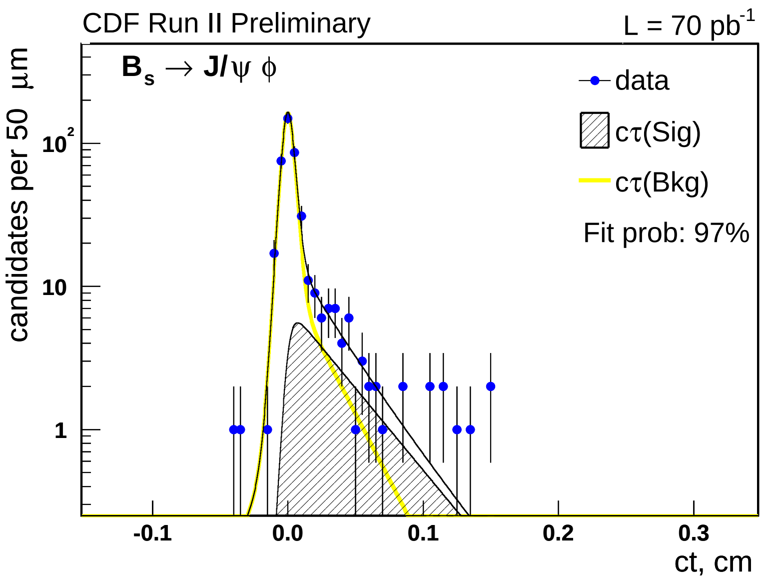

Fig. 7. Proper decay length distribution with fit results overlaid for $B_s^0 \to J/\psi\phi$ $(\phi \to K^+K^-)$.

5.3. $B_s^0-\bar{B}_s^0$ mixing

Tevatron experiments are in the unique position of performing the first observation and measurement of B_s^0 flavour oscillations. This measurement is very important because, combined with existing measurements of B_d^0 oscillations, allows to determine the length of one side of the unitarity triangle.

CDF will reconstruct B_s^0 mesons in fully hadronic decay modes: $B_s^0 \to D_s^-\pi^+(D_s^-\pi^+\pi^-\pi^+)$, $D_s \to \phi\pi^-(K^{*0}K^-)(K_s^0K^-)$. Assuming BR$(B_s \to D_s\pi)$ = 0.3% and BR$(B_s \to D_s 3\pi)$ = 0.8%, we expect ∼ 20,000 reconstructed B_s in 2 fb^{-1}. The measurement consists in counting the number of

B_s which decayed unchanged and those who changed flavour (mixed) before decaying, at different time steps:

$$A_{\text{mix}}(t) = \frac{(N_{\text{unmixed}}(t) - N_{\text{mixed}}(t))}{(N_{\text{unmixed}}(t) + N_{\text{mixed}}(t))} \propto \cos(\Delta m_s t)\,, \tag{1}$$

where Δm_s is the mass difference between the two mass eigenstates. B_s^0 oscillations are known to be very fast (the current combined world average limit is $\Delta m_s \geq 14.9\,\text{ps}^{-1}$ at 95% C.L. that corresponds to an oscillation period $\tau \leq 400$ fs) and so a precise measurement of the B_s^0 proper decay time is crucial. The planned CDF measurement relies on the good proper time resolution provided by the SVX-II detector: 60 fs, which can further improve to 45 fs with the use of Layer00. In addition, the new TOF detector allows to implement new flavour tagging[3] techniques based on the identification of kaons from the B_s or opposite B hadron decays [7]. With the addition of these *kaon b-taggers* the effectiveness of identifying the production flavour of B_s mesons should increase from 5.7% (as it would be using only Run I techniques) to 11.3%.

Putting all together, and assuming a conservative signal to noise ratio $S/B = 2/1$, we should be able to cover abundantly the current SM allowed range for the x_s mixing parameter ($x_s \equiv \Delta m_s \tau(B_s)$, $20 < x_s < 35$) thus providing either a precise measurement or, more excitingly, evidence for new physics.

In 65 pb^{-1} of hadronic trigger data we have observed 40 $B_s^0 \to D_s\pi$ candidates as well as 430 $B_d^0 \to D^-\pi^+$ (figure 8). We are currently pursuing the measurement of their branching ratio.

5.4. B in two charged hadrons, measurement of angle γ

Hadronic two body decays $B_d^0 \to \pi^+\pi^-(K^+\pi^-)$, and $B_s^0 \to K^+K^-$ $(K^-\pi^+)$ look promising. Although the branching fractions are very small, CDF has already reconstructed about 300 of $B^0 \to h^+h^-$ decays in 65 pb^{-1} of hadronic trigger data (figure 9).

The challenge now is to disentangle the four channel contributions under the mass peak. A strategy to statistically separate these contributions using kinematics properties and dE/dx particle identification is giving promising results.

Using this sizable sample we can soon perform interesting measurements: such as the relative branching fractions $B_d^0 \to \pi\pi/K^+\pi^-$ and $B_s^0 \to$

[3] *Flavour tagging* consists in determining whether a neutral B meson (namely B_d^0 or B_s^0) was a particle or an antiparticle at the time of production. Knowing this is essential to determine whether or not the B mixed before decaying (see also Ref. [2]).

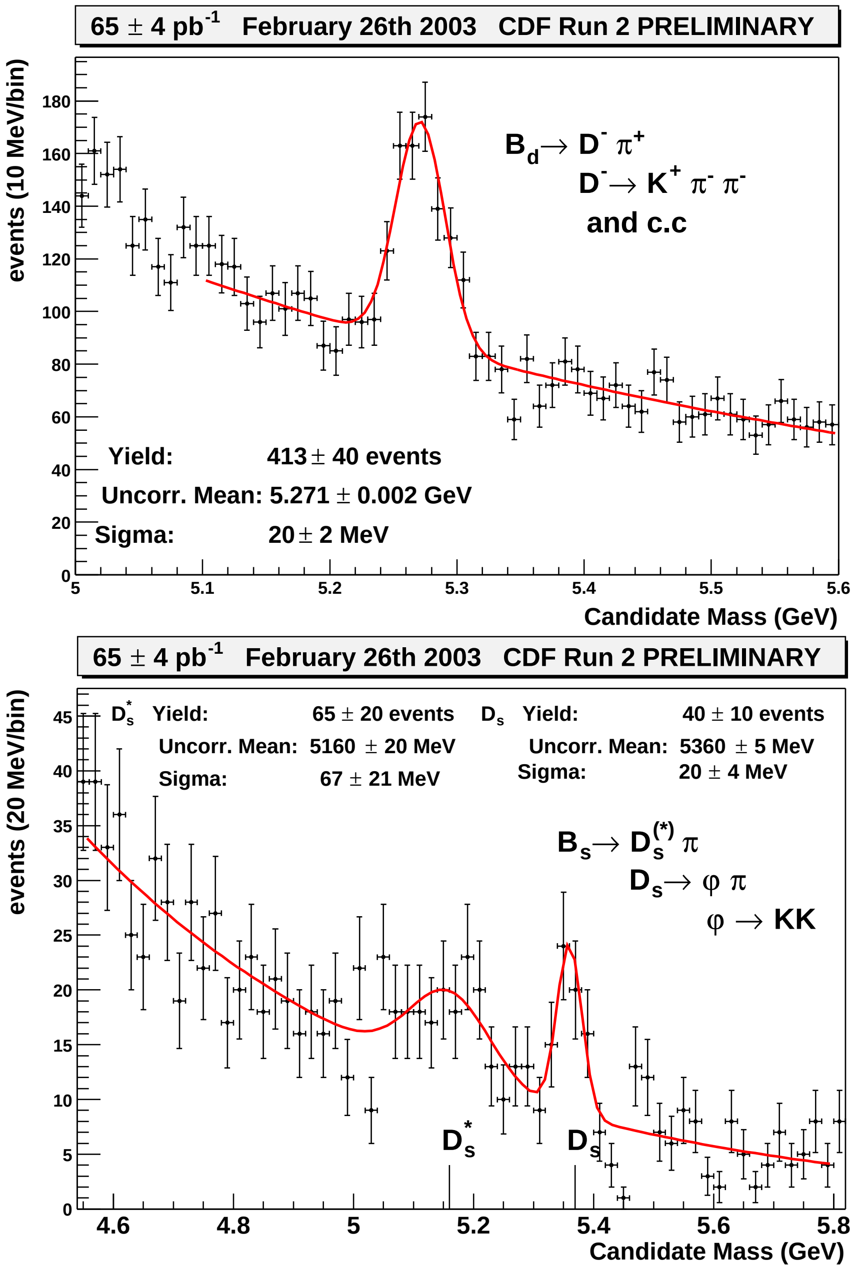

Fig. 8. Mass distributions of (top) $B^0 \to D^-\pi^+$ candidates; (bottom) $B_s \to D_s^{-(*)}\pi^+$ candidates in the first 65 pb^{-1} of data being analysed.

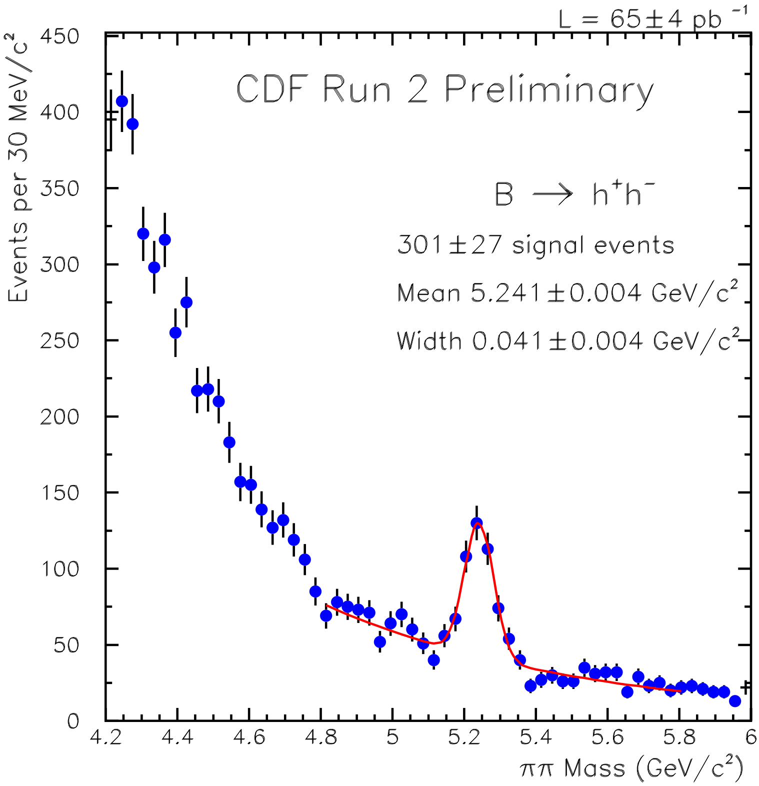

Fig. 9. $\mathrm{B}^0 \to h^+h^-$ signal reconstructed from the hadronic trigger data. The peak is the superposition of the four decay modes $B^0 \to \pi\pi : B^0 \to K\pi : B_s \to KK : B_s \to K\pi \approx 1 : 4 : 2 : 0.5$.

$KK/K^-\pi^+$, and the direct CP-asymmetry in the decays $B_d^0 \to K\pi$ (self-tagging) and $B_d^0 \to \pi\pi$.

A simultaneous measurement of time dependent CP-asymmetries of $B_d^0 \to \pi\pi$ and $B_s^0 \to KK$ decays will eventually allow to perform the first measurement of the unitarity triangle's angle γ ($\gamma \approx O(70°)$). The $B_d^0 \to \pi\pi$ asymmetry is parametrized as:

$$A_{\mathrm{CP}}(t) = A_{\mathrm{CP}}^{\mathrm{dir}} \cos(\Delta m_d t) + A_{\mathrm{CP}}^{\mathrm{mix}} \sin(\Delta m_d t)\,. \qquad (2)$$

A similar formula holds for $B_s^0 \to KK$. The first term is due to the interference of the comparable [10] penguin and tree decay amplitudes, the second term arises from interference of decays with and without mixing. Assuming U-spin symmetry (invariance in $d \leftrightarrow s$ quark exchange) the four asymmetries $A_{\mathrm{CP}}^{\mathrm{dir}}$ and $A_{\mathrm{CP}}^{\mathrm{mix}}$ can be expressed as functions of γ, β and the penguin over tree complex amplitude ratio. Using other measurements to constrain β, this method, proposed by Fleischer [13], allows to extract angle γ with four-fold ambiguity in a way that is unique to Tevatron experiments which alone have access to $B_s^0 \to KK$ CP-asymmetry. Given the expected sample size of $\approx$ 10,000 events in 2 fb^{-1} we foresee to measure γ with an accuracy of 10°(stat) plus 3°(syst).

5.5. Measurement of $\sin(2\beta)$ [2]

Unitary triangle's angle β is measured with a two-fold ambiguity by the asymmetry between the decay of B_d^0 and $\bar{B}_d^0$ to the same CP-eigenstate $J/\psi K_s^0$:

$$A_{\rm CP}(t) = \frac{N_{B^0\to J/\psi K_s^0} - N_{\bar{B}^0\to J/\psi K_s^0}}{N_{B^0\to J/\psi K_s^0} + N_{\bar{B}^0\to J/\psi K_s^0}} \propto \sin(2\beta)\ \sin(\Delta m_d t)\,. \tag{3}$$

This time dependent measurement was performed in Run I using ≈ 400 $B^0 \to J/\psi K_s^0$ events, and later refined adding 60 $B^0 \to \psi(2{\rm S})K_s^0$ events [1]: $\sin(2\beta)$=0.91±0.32(stat)±0.18(syst). Run II expectation is to collect 20K events in 2 fb^{-1} and refine this measurement down to 0.05 statistics uncertainty. Although B-factories are already measuring $\sin(2\beta)$ at this level of precision [3], it is important to have a CDF measurement to be used in conjunction with others which suffer of common systematics (see for example angle γ measurement described above).

5.6. Measurements with $B_s^0 \to J/\psi\phi$

$B_s^0 \to J/\psi\phi$ events are interesting because they are a sensible probe for new physics. Figure 6 shows the first 76±11 events reconstructed in 72 pb^{-1} of di-muon trigger data ($\phi \to KK$). Few thousand are expected in 2 fb^{-1}.

CP-asymmetry in this channel measures the CKM matrix phase angle β_s which is expected to be very small in the SM ($\sin(2\beta_s) \approx 0.03$). CDF II sensitivity with 2 fb^{-1} is poor ($\sigma(\sin(2\beta_s)) \approx 0.1$). However observing a non-zero asymmetry would be an unambiguous signal for new physics.

The same sample can also be used to measure the lifetime difference between the two B_s mass eigenstates, $\Delta\Gamma_s = B_s^{\rm H} - B_s^{\rm L}$ (current LEP limit: $\Delta\Gamma_s/\Gamma_s < 0.31$). CDF expected uncertainty with 2 fb^{-1}, $\sigma(\Delta\Gamma/\Gamma) \approx 0.05$ (assuming a 0.7 CP-even fraction [14]), would be enough to probe the SM expected range ($0.05 < \Delta\Gamma/\Gamma < 0.20$).

5.7. Heavy B hadrons spectroscopy

Many properties of the heavier B hadrons such as B_s, B_c and Λ_b are yet either unmeasured or poorly measured. During Run I the B_c meson was first observed at CDF using the semi-leptonic channels [5] $B_c^+ \to J/\psi\ e^+(\mu^+)\ \nu$ ($\sim$ 20 events). Λ_b^0 baryons were reconstructed in J/ψ ($\Lambda_b^0 \to J/\psi \Lambda^0$) and semi-leptonic ($\Lambda_b^0 \to \Lambda_c^+\ l^-\ \bar{\nu}$) channels [15].

In Run II we will have access also to new decay modes: exclusive $B_c^+ \to J/\psi\ \pi^+$, or the more abundant fully hadronic modes as $B_c \to B_s\pi$ and $\Lambda_b^0 \to \Lambda_c^+\pi^-(\Lambda_c \to pK\pi)$, $\Lambda_b^0 \to pD^0\pi^-$. These channels will provide new measurements of masses, lifetimes and branching ratios. In particular the two body, self-tagging, decay modes $\Lambda_b^0 \to pK^-(p\pi^-)$ are efficiently collected by the hadronic trigger and are especially interesting for searching for CP-asymmetries [16].

6. Conclusions

The CDF detector is back in operation. Its B physics potential is great thanks to the enhanced tracking and particle ID capabilities, and the innovative secondary vertex trigger. In particular CDF has unique capabilities for B_s and heavier hadrons.

Although understanding the detector is a continuous process, CDF is performing well and the first 70 pb^{-1} of analysed data already show interesting results.

We expect soon preliminary results from $B_d^0 \to \pi\pi$ and $B_s^0 \to KK$, along with precise measurements of masses, lifetimes and branching ratios for Charms and Beauties. With $1-2$ fb^{-1} we plan to have precise measurements of B_s mixing, direct and mixing CP-asymmetries in two body decays along with a measurement of angle γ at $10°$. We also foresee a quite interesting charm physics program [17] (we expect $O(10^7)$ fully reconstructed charm decays in 2 fb^{-1}) with measurements of CP-asymmetries and mixing in the D-sector, and searches for rare decays. Data taking will then continue with the final goal of reaching 10 fb^{-1} of data before starting of LHC.

In conclusion, for years to come the Tevatron will remain a unique place of interesting B physics measurements complementing and extending physics programs at B-factories.

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