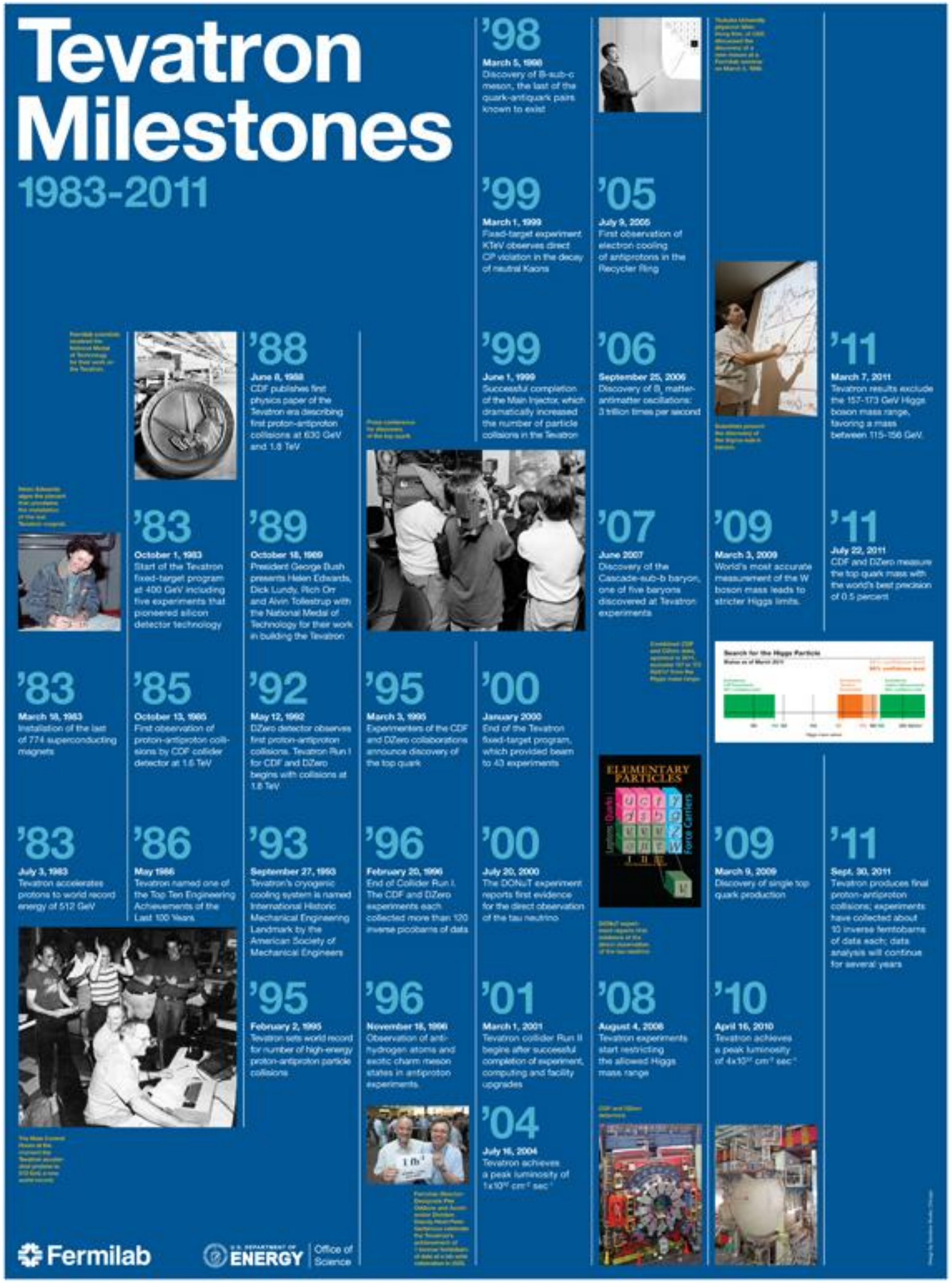
Tevatron Milestones
Latin-American contributions

Eduard De La Cruz Burelo
CINVESTAV-IPN Mexico



Tevatron …
28 years of success

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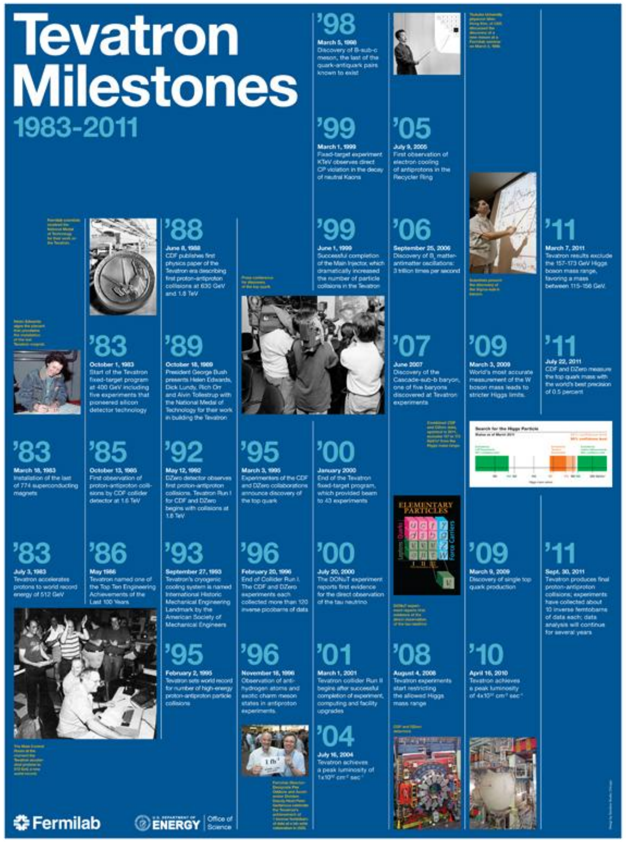
Disclaimer

- I focused on the Tevatron era and the listed “milestones” in the official poster.
- This is a personal account not a detailed and precise historical review.
- I concentrated on institutional Latin-American contributions
- Many contributions could escape to what I know due to ignorance, nothing else



Major contributions of the Tevatron experiments and accelerator complex

Scientific Highlights

Collider experiments

The Tevatron's collider program began proton-antiproton coll
in 1985 and has led to about 1,000 Ph.D. degrees and about
paper a week through work on the CDF and DZero experime

Discovered:
- the top quark and determined its mass to a high preci
- two distinct production mechanisms for the top quark: and single production
- five B baryons (2 cascade, 1 omega and 2 sigma _b)
- B_c meson
- Y(4140), a new quark structure
- B_s oscillations

Observed:
- strongest evidence yet for violation of matter-antimatt symmetry in particles containing bottom quarks.
- evidence for CP violation in neutral B mesons

Measured:
- the bottom quark and defined its properties
- precise lifetimes of charm particles
- magnetic moments of particles containing strange qu
- leading constraints on Higgs boson
- most precise measurement of W boson mass by a si
- strong coupling constant and other parameters relate

Fixed-target experiments

About 400 Ph.D. degrees and more than 300 papers were generated through work on the Tevatron's 43 fixed-target experiments operating periodically from 1983 to 2000. Many experiments involved more than 100 physicists and engineer

Discovered:
- tau neutrino

Observed:
- direct CP violation in kaon decays
- antihydrogen atoms
- some of the earliest evidence of particle jets

Measured:
- quark content, structure of proton and neutron

Major contributions of the Tevatron experiments and accelerator complex

Major engineering achievements

Detector technology

- First use of silicon vertex detectors in a hadron collider e
- Developed significant improvements in triggering, trackin
- Pioneered Ring Imaging Cerenkov Counter.
- Developed silicon microvertex detectors for heavy quark
- Developed various integrated circuit advances.
- Developed CsI photon calorimeter.
- Major advances in transition radiation detector.

Computing technology

- Helped advance the use of computer farms.
- Data analysis and storage needs helped push the development of Grid computing.
- Pioneered analysis systems to select, analyze and store unprecedented petabytes of data. CDF and DZero can each analyze a billion collisions per second, saving 200 of those to tape for future study.

Accelerator technology

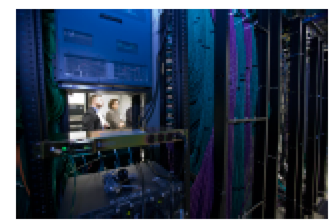
- First major superconducting synchrotron.
- First electron cooling system developed for use with a high-energy beam.
- New radio-frequency manipulation techniques pioneered.
- Tevatron's cryogenic cooling system was named an International Historic Mechanical Engineering Landmark by the American Soci
- Tevatron's antiproton source is the most intense, consist and enabled the first proton-antiproton research in the Te

Major contributions of the Tevatron experiments and accelerator complex

Accelerator technology *(Cont'd...)*

- The Tevatron is the world's most productive proton-antiproton collider, operating at more than 300 times its initial design luminosity, or collisions per second.
- Because the Tevatron required such a large amount of superconducting wire, it provided the motivation for the expansion of the superconducting wire industry.
- Superconducting magnet technology was developed to double the energy output of the Main Ring while cutting its energy use by one-third.
- Innovative design work on the Tevatron earned four scientists the National Medal of Technology in 1989.
- R&D Magazine gave the Tevatron four awards for the most significant technical products of the year in 1983.
- Tevatron named one of the Top 10 Engineering Achievements of the Last 100 Years by the Illinois Society of Professional Engineers in 1986.

Other significant achievements



- The top quark discovery was named among the top 10 scientific discoveries ever in the six-county Chicago region by former Chicago Mayor Richard Daley.
- Fermilab broke barriers to international collaboration, giving several Latin American countries their first opportunities to expand their particle physics work beyond theory, Russian particle physics the first chance to work at a U.S. lab and Chinese particle physicists a home during the Chinese Cultural Revolution.
- Work with the Tevatron trained personnel for the development and operation of the next-generation of accelerators, including the Large Hadron Collider.
- Three-story detectors and cutting-edge accelerators provided a unique training ground for hundreds of engineers, computer scientists, physicists and technicians, many of whom found their way into private industry.
- Planning and development for the Large Hadron Collider and its experiments relied heavily on expertise and technology developed at the Tevatron.

Compiled July 2011

Fermilab

Major contributions of the Tevatron experiments and accelerator complex

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- precise lifetimes of charm particles
- magnetic moments of particles containing strange quarks
- leading constraints on Higgs boson
- most precise measurement of W boson mass by a single experiment and overall
- strong coupling constant and other parameters related to the strong force

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PAN AMERICAN SYMPOSIUM ON HEP AND TECHNOLOGY, COCOYOC, MEXICO, 4 JAN 1982

~150 attendants, including 100 from Latin-American countries (practically none of them a HEP experimentalist). The US delegation: The U.S. delegation consisted of L. Lederman, J.D. Bjorken, S Glashow, R. Feynman, B. Richter, A. Tollestrup, N. Samius, R. Marshak, M. Moravcsik, W. Panofsky, Richard Taylor and R.R. Wilson.

AIP | Conference Proceedings

Fermilab and Latin America

Leon M. Lederman

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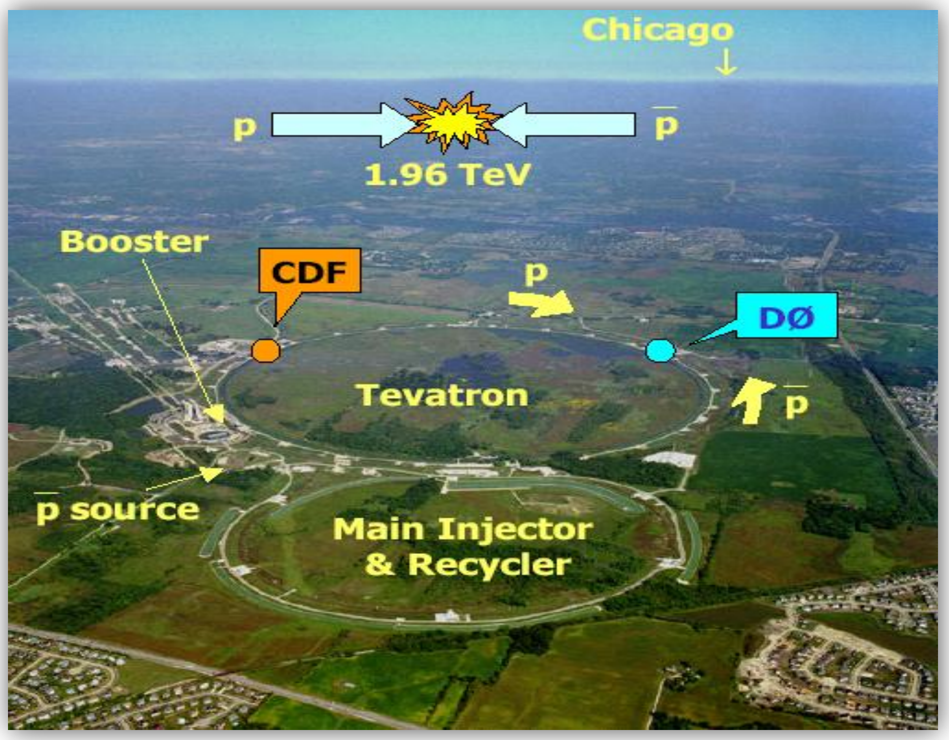
Tevatron physics program



- Fixed target experiments (1983 – 2000)
- Collider experiments (1985 – 2011)

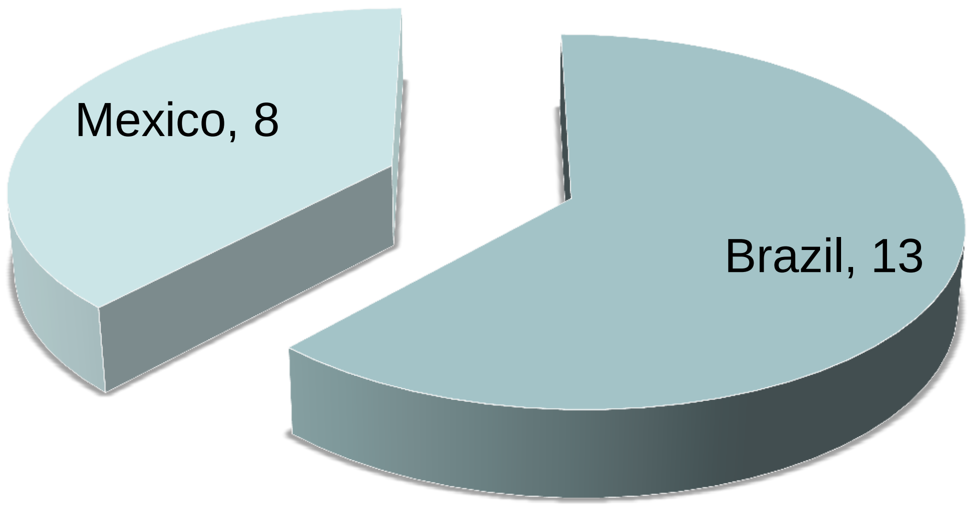
FIXED TARGET PROGRAM

Fixed target program in numbers

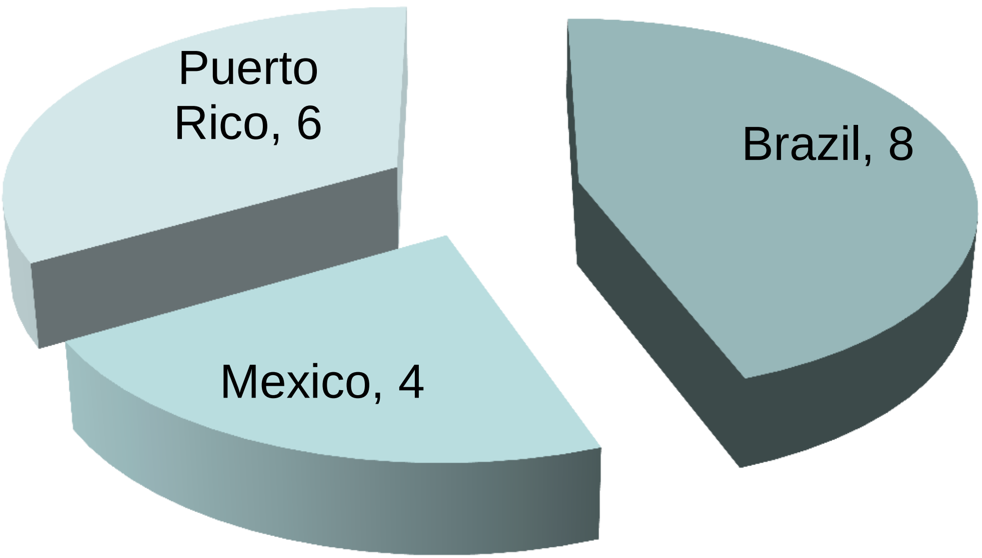
- 43 experiments
- 294 papers
- 383 doctorates and 84 master degrees
- 104 universities participated
- USA + 17 foreign countries, among them Brazil and Mexico

Most of these numbers are up to 2000, some experiments continued analyzing data, publishing and graduating students.

Doctorates from Latin American Institutions



M.Sc. from Latin American Institutions



Tevatron Fixed Target milestones

- October 1st, 1983: Start of the Tevatron fixed-target program at 400 GeV with five fixed-target experiments.
- November 18th,1996: Observation of antihydrogen atoms and exotic charm meson states in antiproton experiments.
- August 5th, 1997: The Tevatron delivers a record intensity 800 GeV beam for fixed-target experiments: 2.86 x 1013.
- March 1st, 1999: Fixed-target experiment KTeV observes direct CP violation in the decay of neutral kaons.
- January 2000: End of the Tevatron fixed-target program, which provided beam to 43 experiments.
- July 20th, 2000: The DONuT experiment reports first evidence for the direct observation of the tau neutrino.
- November 7th, 2001: NuTeV makes precision measurements of weak interaction parameters.
- June 22th, 2005: FOCUS experiment completes comprehensive studies of charm mesons and baryons.

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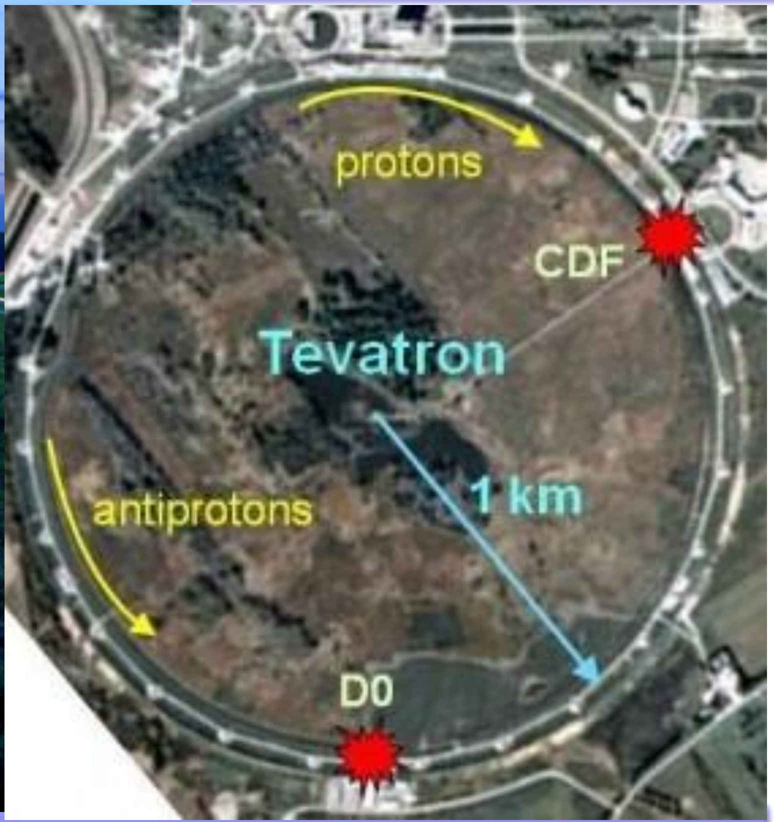

COLLIDER PROGRAM

Collider program milestones

- October 13th, 1995: First observation of proton-antiproton collisions by CDF collider detector at 1.6 TeV.
- May 12th, 1992: DZero detector observes first proton-antiproton collisions.
- August 31st, 1992: Collider Run I physics program begins with proton-antiproton collisions at 1.8 TeV.
- March 3th, 1995: Experimenters of the CDF and DZero collaborations announce discovery of top quark.
- February 20th, 1996: End of Collider Run I. The Tevatron has delivered 180 inverse picobarns to both CDF and DZero.
- March 5th, 1998: Discovery of Bc meson, the last of the quark-antiquark pairs known to exist.
- September 25th, 2006: Discovery of Bs matter-antimatter oscillations: 3 trillion times per second.
- October 26th, 2006: Discovery of Sigmab baryons (up-up-bottom and down-down-bottom quark combinations).
- June 2007: Discovery of the Cascade-b baryon (down-strange-bottom combination).
- August 4th, 2008: Tevatron experiments start restricting the allowed Higgs mass range.
- September 3, 2008: Discovery of the Omegab baryon.
- March 3, 2009: World's most accurate measurement of the W boson mass leads to stricter Higgs limits.
- March 9, 2009: Discovery of single top quark production.
- March 7th, 2011: Tevatron results exclude 157-173 GeV Higgs boson mass range, favoring a mass between 115-156 GeV
- June 20th, 2011: Discovery of the Xib, a heavy relative of the neutron.
- September 30, 2011: Tevatron produces final proton-antiproton collisions; experiments have collected about 10 inverse femtobarns of data each; data analysis will continue for several years.
- March 12th, 2012: World's best measurement of W boson mass points to Higgs mass and tests Standard Model.
- March 7th, 2012: Using different search techniques, Tevatron physicists see hints of Higgs boson sighting consistent with those from LHC.

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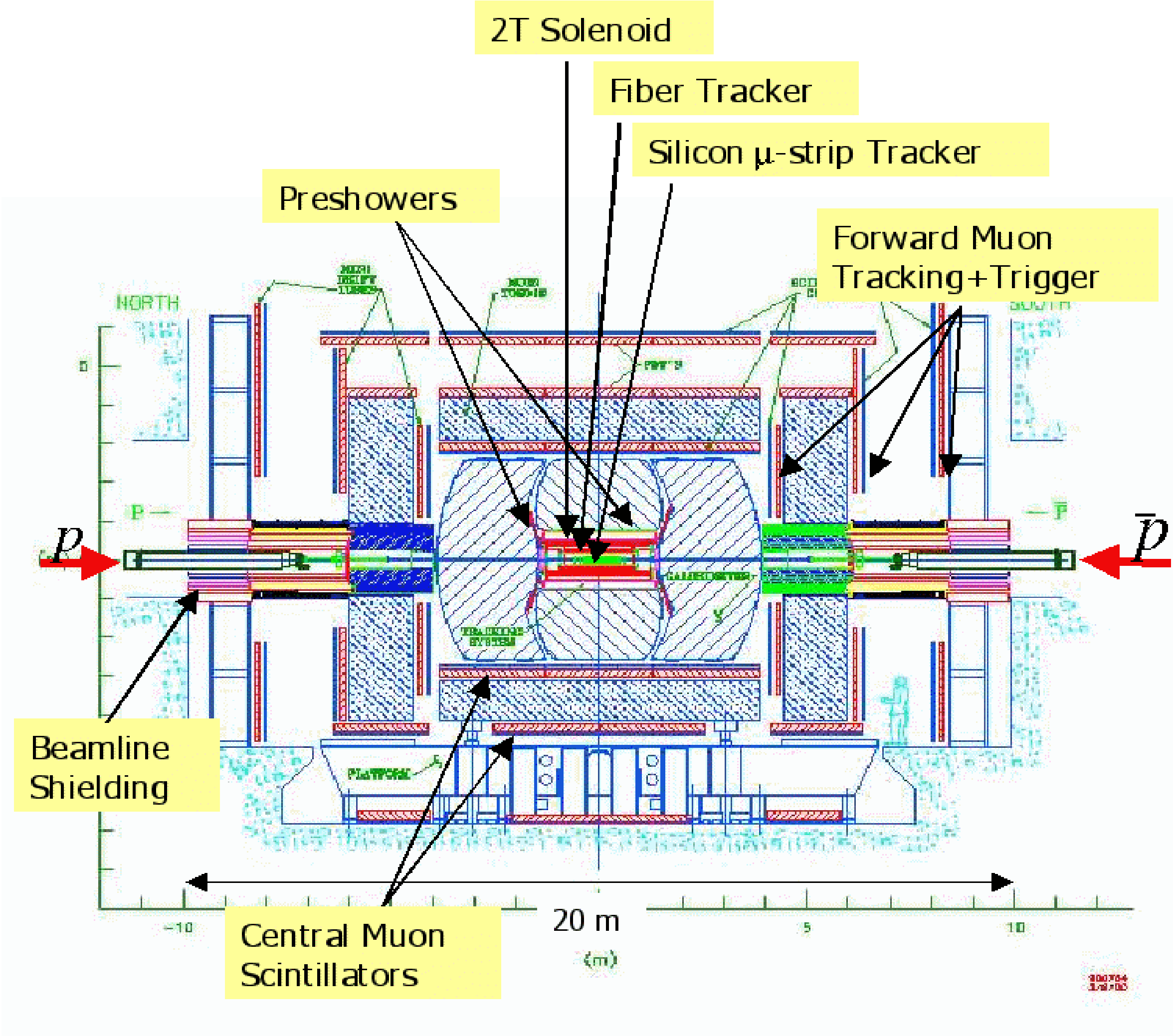
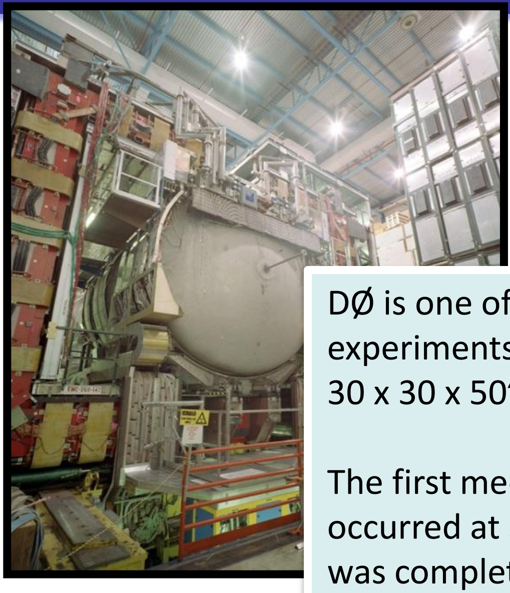
DØ experiment

DØ is an international collaboration of 580 physicists from 19 nations who have designed, built and operate the DØ detector at the Tevatron and perform data analysis

The DØ detector





DZero

DØ is one of two large particle physics experiments at Fermilab. Its dimensions are 30 x 30 x 50' and it weighs about 5,000 tons.

The first meeting envisioning its design occurred at Stony Brook in 1983. Construction was completed in February 1992 and DØ took data from 1992 – 1996. The experiment was upgraded from 1996 – 2001 and has been running nearly continuously since.

Data Facts

Inspects 1.7 million collisions/second
Records ≈100 events/second
Data flow is 20 Megabytes/second
300,000 giga bytes of data recorded/year
4.5 billion events recorded to date

Personnel Facts

533 scientists
150 graduate students
81 institutions (38 in the US)
18 countries
Second largest national contingent: Russian

Technical Highlights

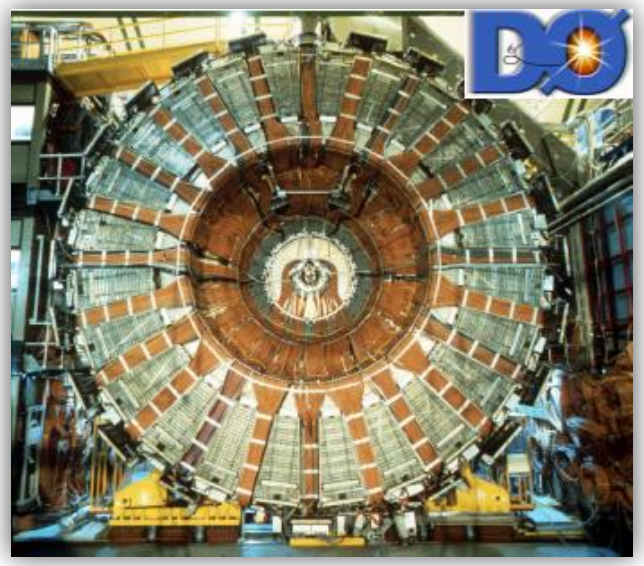
Inner silicon detector, 700,000 channels
Scintillating fiber tracker & preshower 100,000 channels
Uranium/liquid argon calorimeter, 50,000 channels
Muon system (wire chambers and scintillator), 70,000 channels

Accomplishments

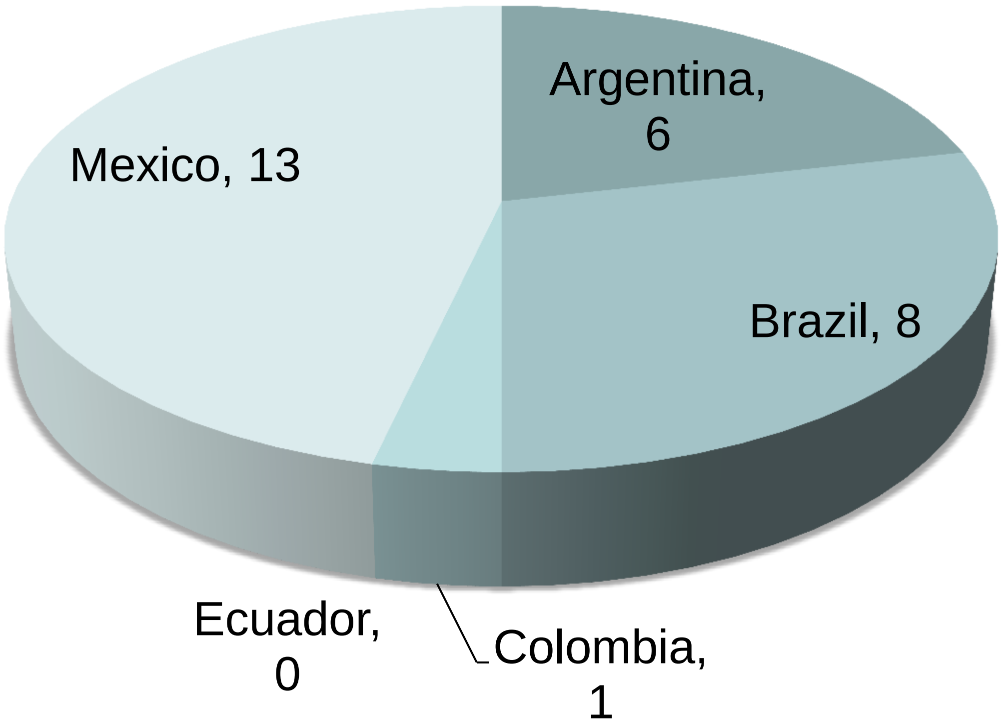
> 250 papers & > 250 Ph.D. theses to date
Discovery of the top quark.
Observation of B-meson mixing that might shed light on the lack of observed antimatter in the universe.
Discovered exotic baryons (Ξ_b, Ω_b)

DZero in numbers so far

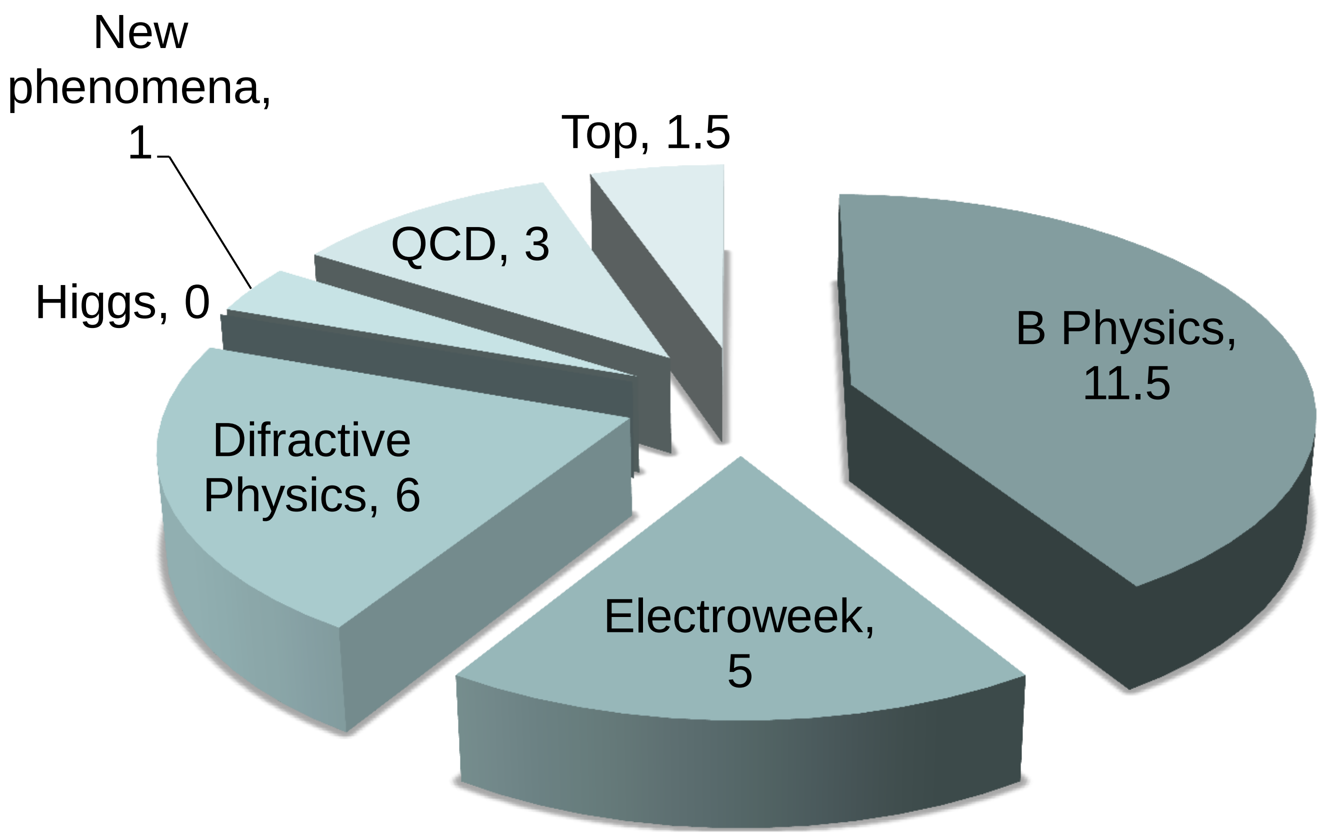
- 285 published physics papers
- 440 doctorate degrees (1993-2012)
- 28 doctorate degrees (1995-2012) from Latin-American institutions.



Latin-American Doctorate degrees distribution



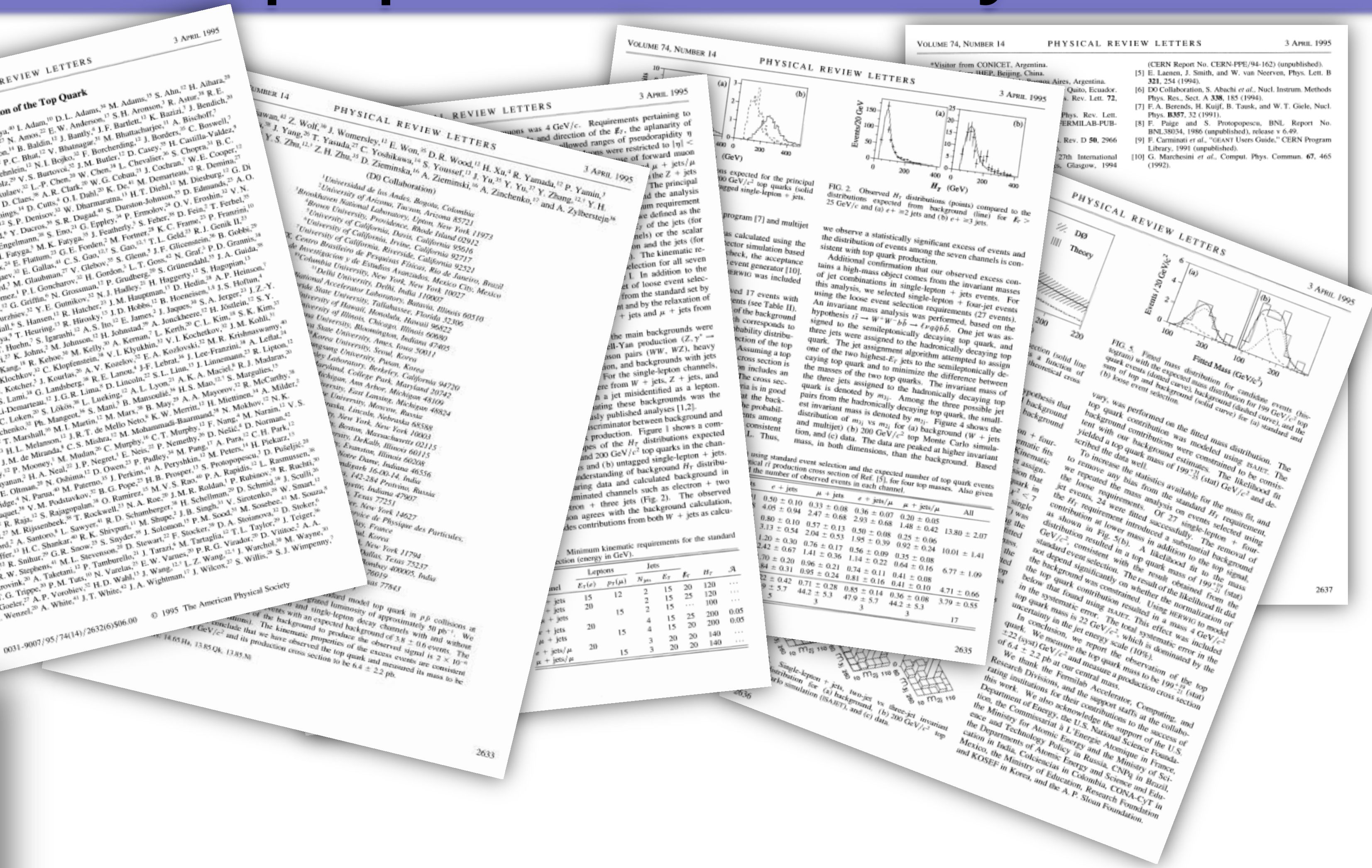
Latin-American Doctorates by physics

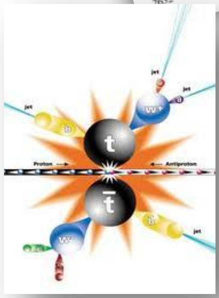


DZero operation manpower

	2005	2006	2007	2008	2009	2010	2011
Brazilian Consortium	16.47	13.27	10.97	5.70	5.54	4.37	2.27
Buenos Aires, Argentina	0.40	1.30	1.30	1.25	1.70	0.45	-
Cinvestav, Mexico	4.5	5.20	5.50	9.70	6.55	7.55	5.90
Quito Ecuador	0.60	0.66	0.66	0.66	0.60	0.64	0.62
Uniandes, Colombia	0.37	1.97	-	-	-	0.75	0.30
Fermilab	40.05	33.19	32.98	31.78	31.01	32.47	27.96
Total	439.73	407.41	355.43	307.28	276.53	258.36	217.75
Latinoamerica	5.08%	5.50%	5.19%	5.63%	5.20%	5.33%	4.17%
Fermilab	9.11%	8.15%	9.28%	10.34%	11.21%	12.57%	12.84%

Top quark discovery





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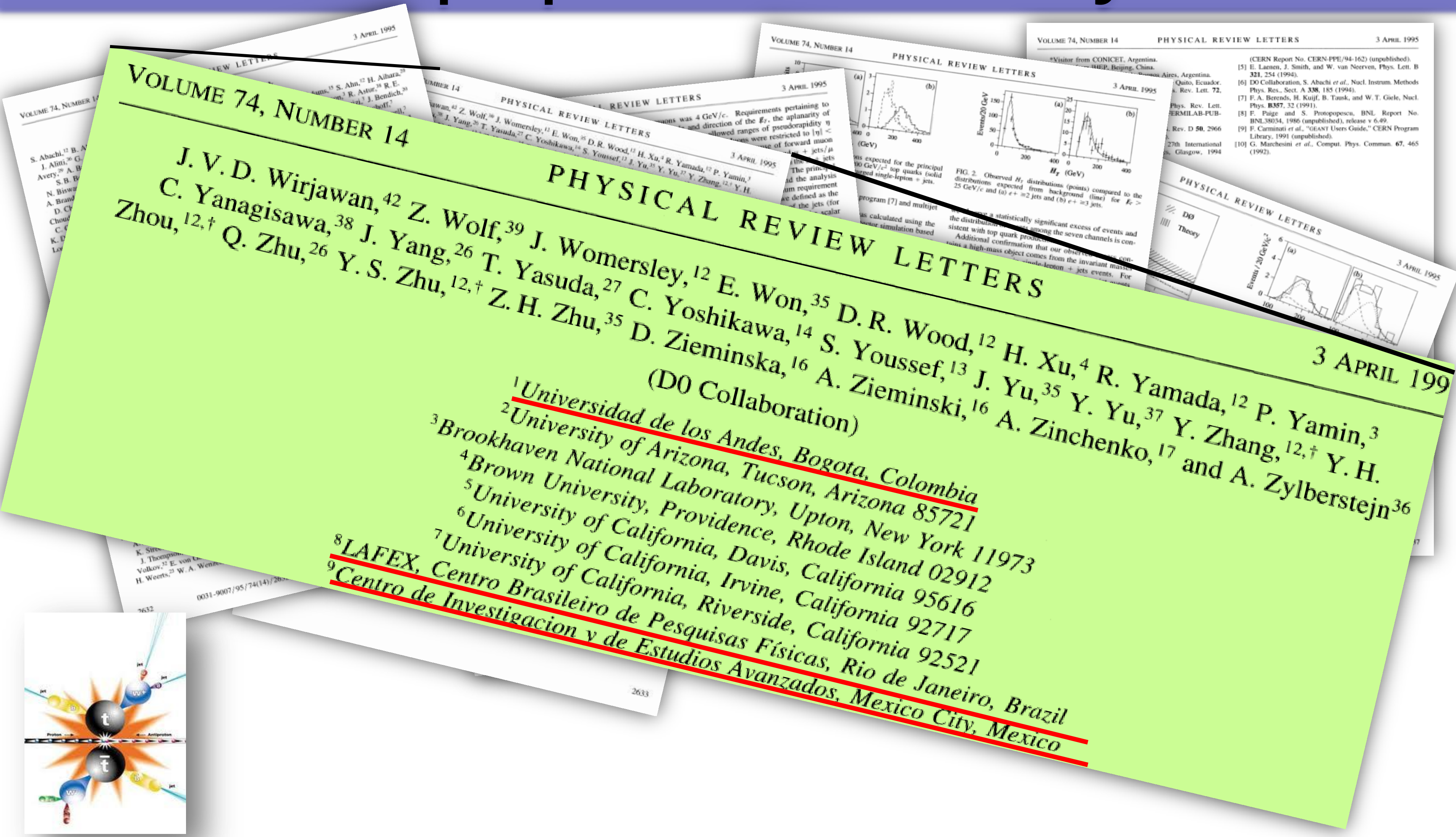

VOLUME 74, NUMBER 14 PHYSICAL REVIEW LETTERS 3 APRIL 199

J. V. D. Wirjawan,[42] Z. Wolf,[39] J. Womersley,[12] E. Won,[35] D. R. Wood,[12] H. Xu,[4] R. Yamada,[12] P. Yamin,[3] C. Yanagisawa,[38] J. Yang,[26] T. Yasuda,[27] C. Yoshikawa,[14] S. Youssef,[13] J. Yu,[35] Y. Yu,[37] Y. Zhang,[12,†] Y. H. Zhou,[12,†] Q. Zhu,[26] Y. S. Zhu,[12,†] Z. H. Zhu,[35] D. Zieminska,[16] A. Zieminski,[16] A. Zinchenko,[17] and A. Zylberstejn[36]

(D0 Collaboration)

[1]Universidad de los Andes, Bogota, Colombia
[2]University of Arizona, Tucson, Arizona 85721
[3]Brookhaven National Laboratory, Upton, New York 11973
[4]Brown University, Providence, Rhode Island 02912
[5]University of California, Davis, California 95616
[6]University of California, Irvine, California 92717
[7]University of California, Riverside, California 92521
[8]LAFEX, Centro Brasileiro de Pesquisas Físicas, Rio de Janeiro, Brazil
[9]Centro de Investigacion y de Estudios Avanzados, Mexico City, Mexico

Top quark discovery

Eleven of the 14 single-lepton + jets candidate events selected using the standard cuts were fitted successfully. Figure 5(a) shows the fitted mass distribution. An unbinned likelihood fit, incorporating top quark and background contributions, with the top quark mass allowed to

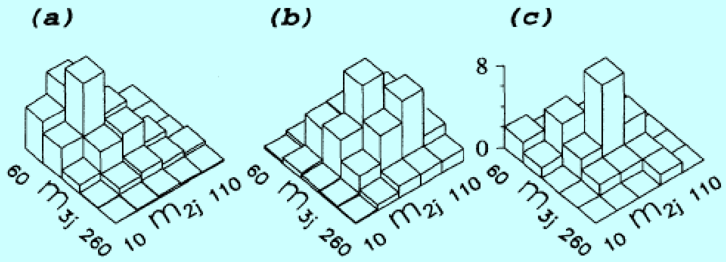

FIG. 4. Single-lepton + jets, two-jet vs three-jet invariant mass distribution for (a) background, (b) 200 GeV/c^2 top Monte Carlo simulation (ISAJET), and (c) data.

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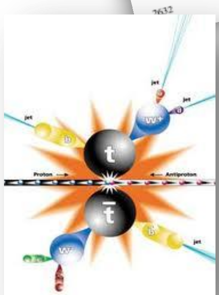
uncertainty in the jet energy scale (10%).

In conclusion, we report the observation of the top quark. We measure the top quark mass to be 199^{+19}_{-21} (stat) ± 22 (syst) GeV/c^2 and measure a production cross section of 6.4 ± 2.2 pb at our central mass.

We thank the Fermilab Accelerator, Computing, and Research Divisions, and the support staffs at the collaborating institutions for their contributions to the success of this work. We also acknowledge the support of the U.S. Department of Energy, the U.S. National Science Foundation, the Commissariat à L'Energie Atomique in France, the Ministry for Atomic Energy and the Ministry of Science and Technology Policy in Russia, CNPq in Brazil, the Departments of Atomic Energy and Science and Education in India, Colciencias in Colombia, CONA-CyT in Mexico, the Ministry of Education, Research Foundation and KOSEF in Korea, and the A. P. Sloan Foundation.



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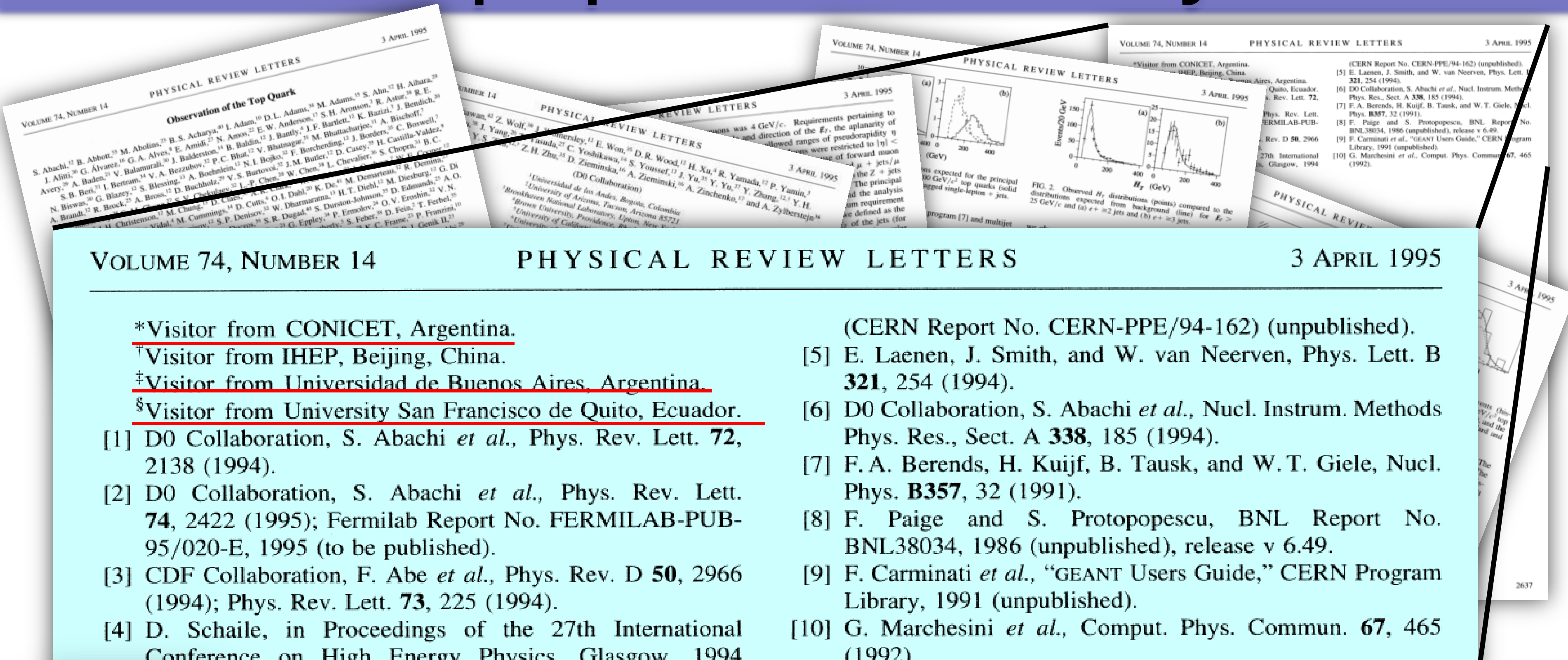

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*Visitor from CONICET, Argentina.
†Visitor from IHEP, Beijing, China.
‡Visitor from Universidad de Buenos Aires, Argentina.
§Visitor from University San Francisco de Quito, Ecuador.

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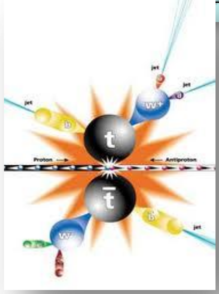
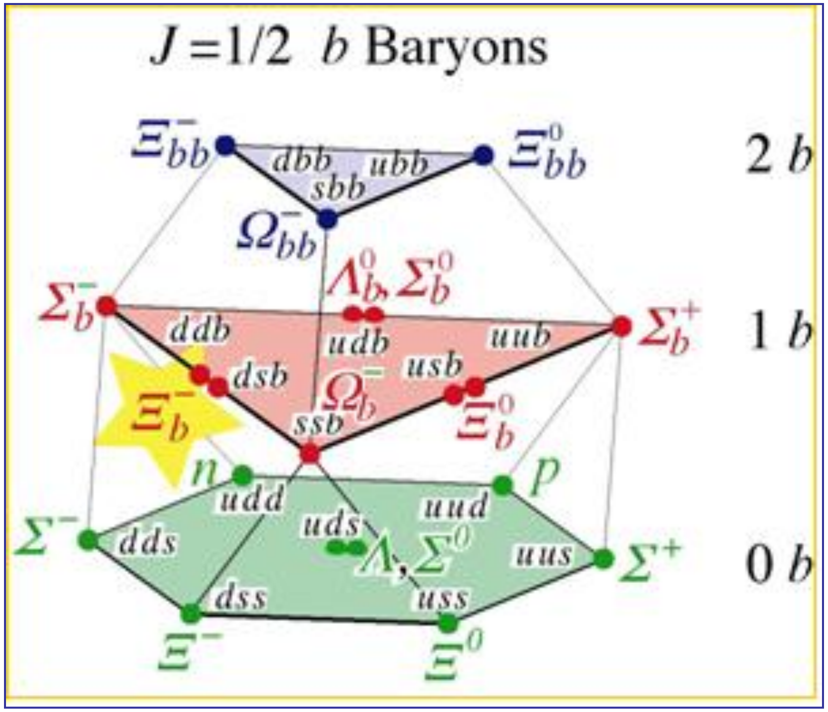
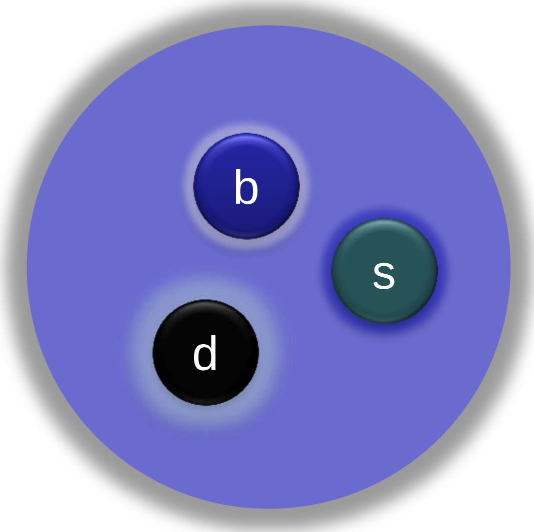




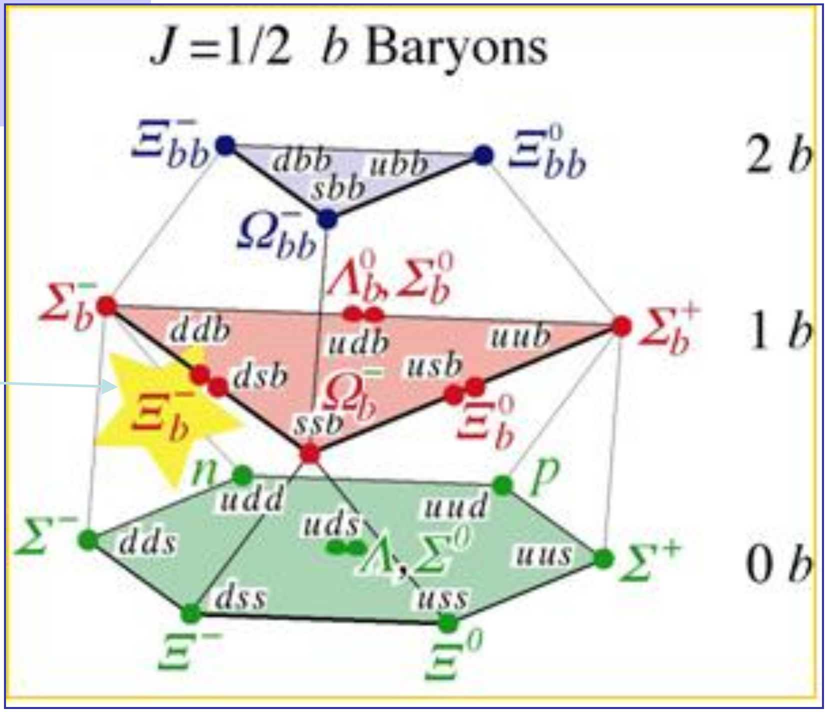


THE Ξ^-_b DISCOVERY

Ξ_b^-(bds) observation

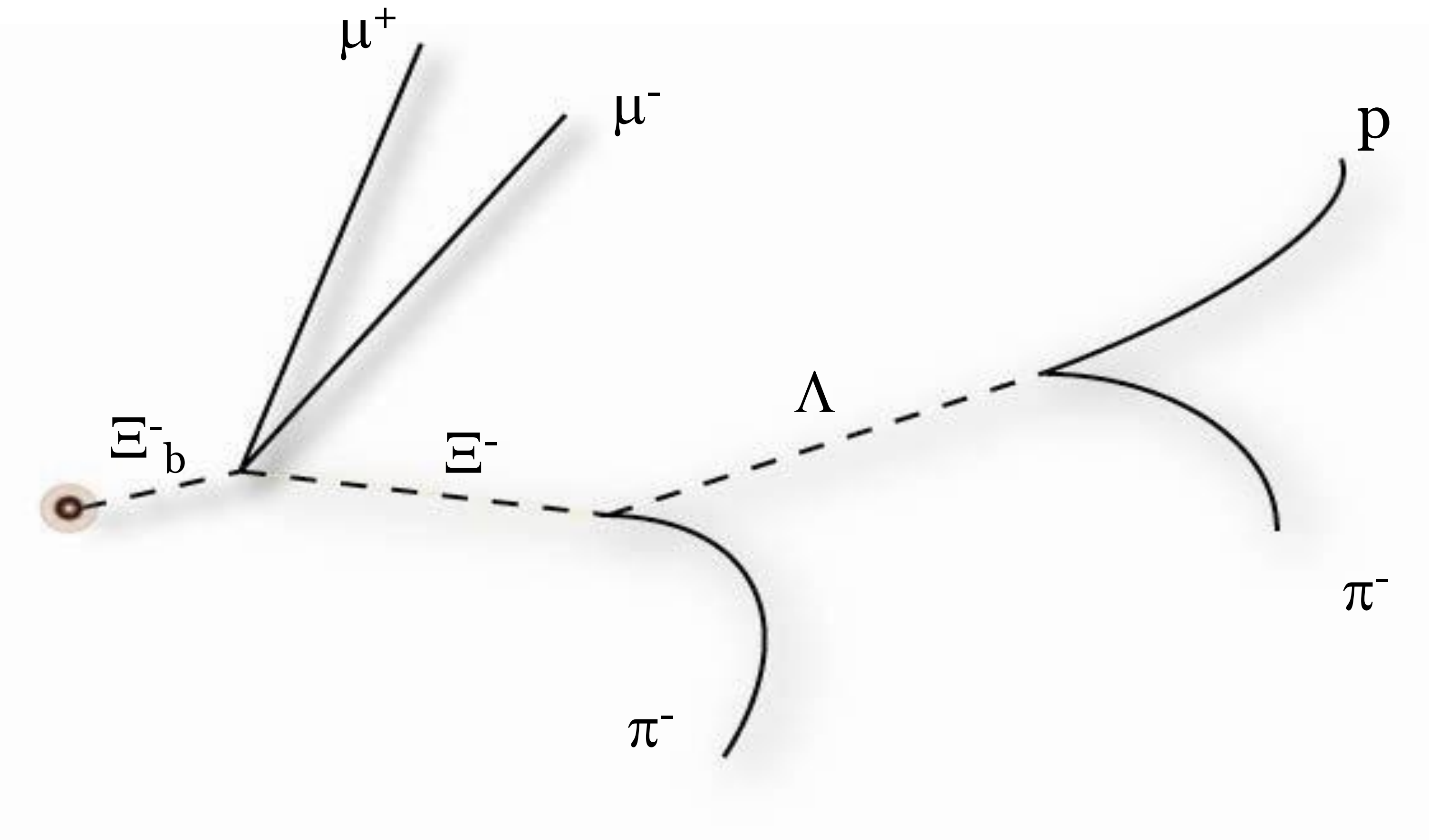
- Ξ_b^- mass predicted to be between 5.7-5.8 GeV
- Predicted $M(\Lambda_b) < M(\Xi_b^-) < M(\Sigma_b)$
- From CDF's Σ_b mass and predicted hierarchy:
  5.624 GeV $< M(\Xi_b^-) <$ 5.808 GeV
- Ξ_b^- lifetime by LEP: 1.42 +0.28/-0.24 ps.*

We searched for this particle. The first one with one quark from each generation of matters.



* This is the world average (ALEPH+DELPHI).
HFAG: arXiv:0704.3575 [hep-ex]

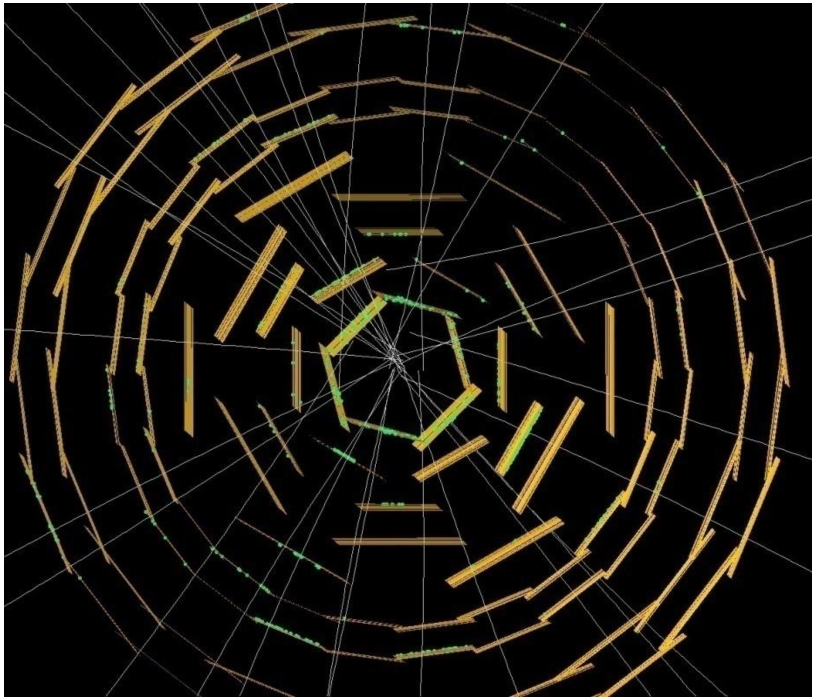
How we look for it?



We searched for Ξ_b in $\Xi_b^- \to J/\psi + \Xi^-$

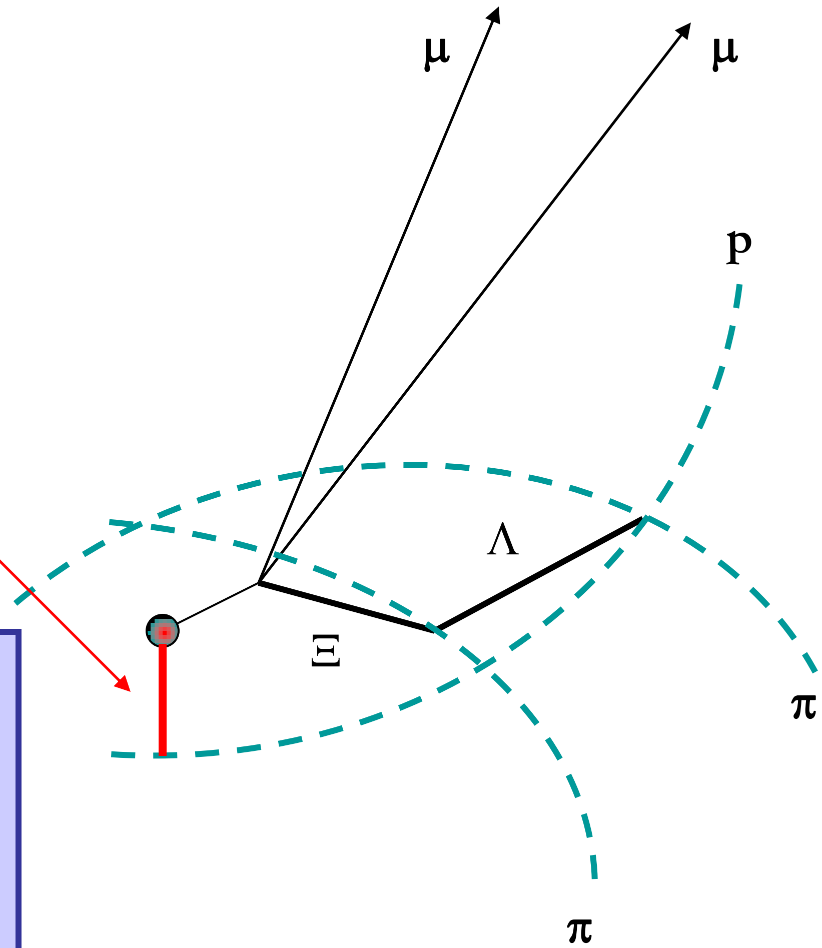
A challenge for the DØ detector

- Fiber Tracker
  - Radius : 20cm - 52cm
  - Reconstructing tracks + measure momentum of charged particles
- SMT
  - Tracking out to η=~3
- Layer 0 -
  - Fits around the beam pipe and inside current silicon detector Radius : 16mm
  - Greatly improved resolution
  - **Not used in this analysis**
- *Long lived neutrals may miss inner layers*



And it was a problem

When tracks are reconstructed, a maximum impact parameter is required to increase the reconstruction speed and lower the rate of fake tracks.



But for particles like the Ξ_b^-, this requirement could result in missing the π and proton tracks from the Λ and Ξ^- decays

Reconstructing all again …

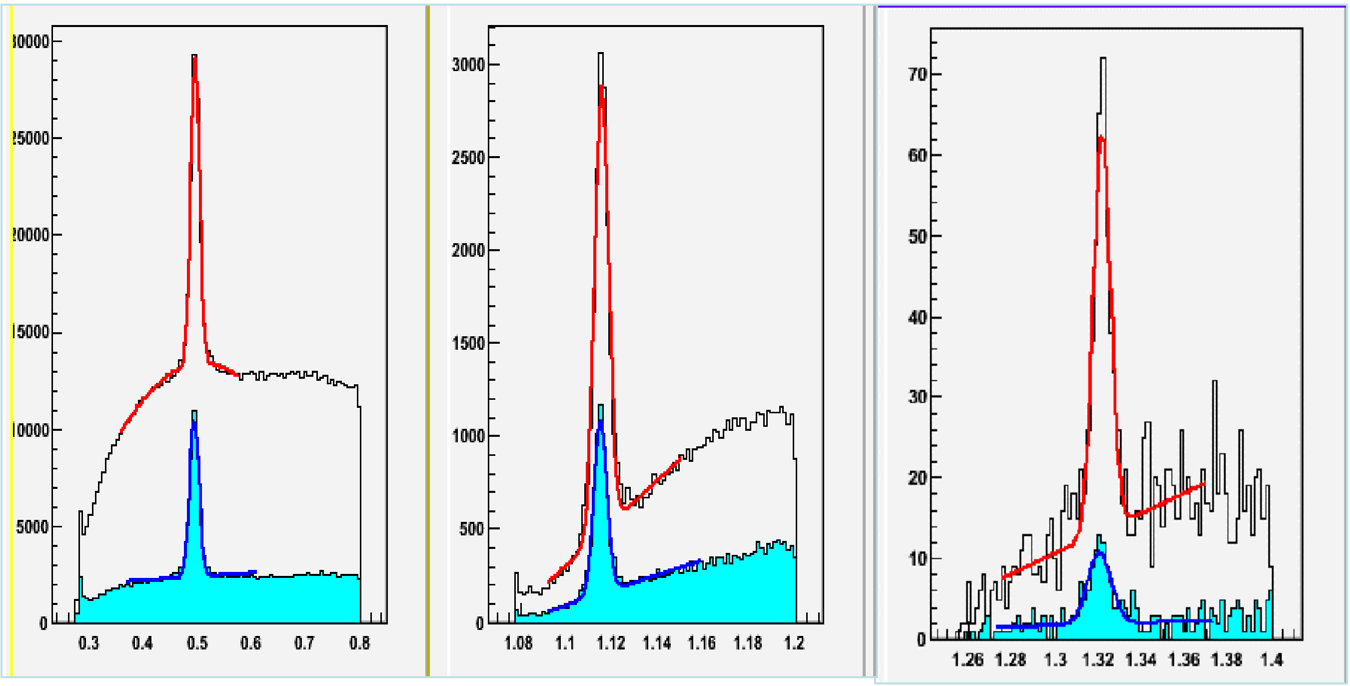
- More than 500 Millions of p-pbar collisions (events) in Run II (DØ)
- "Reconstructing" an event takes few minutes

$$500 \times 10^6 \times 3(\text{min}) \approx 1 \times 10^6 \text{days}$$

Impossible, we have to do something else

After solving the problem

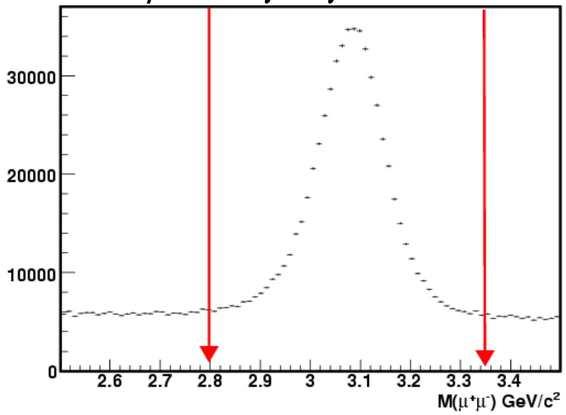
$K_s^0 \rightarrow \pi^+\pi^-$ $\Lambda \rightarrow p\pi^-$ $\Xi^- \rightarrow \Lambda\pi^-$



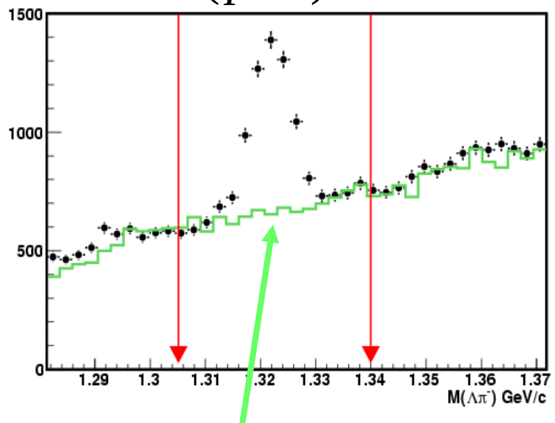
Opening up the IP cut: (**Before**) (**After**)

Ξ_b signal: J/ψ + Ξ^-

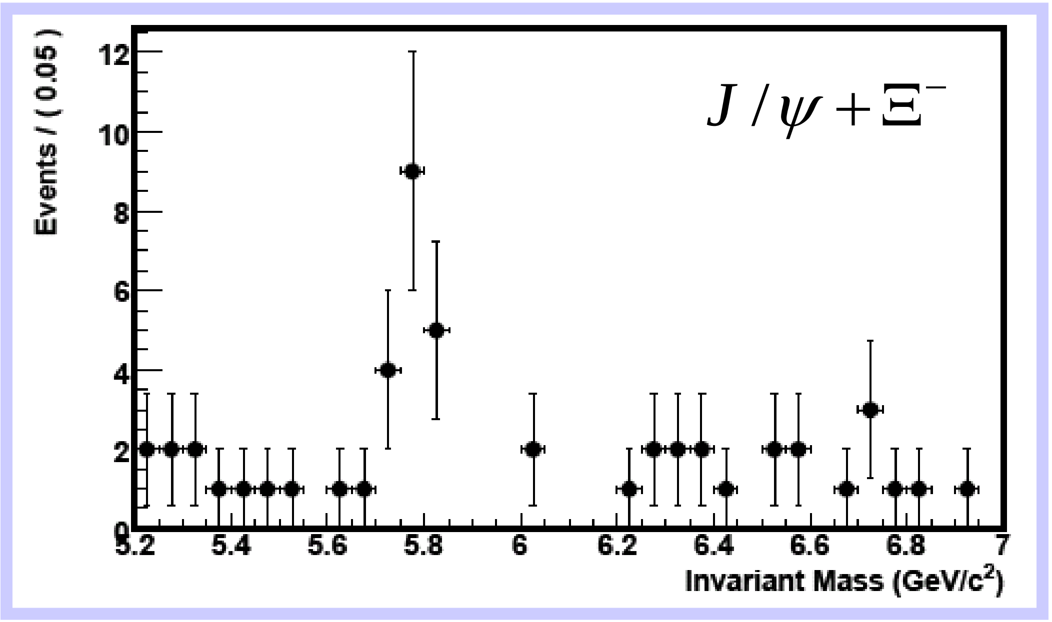
$J/\psi \to \mu^+\mu^-$



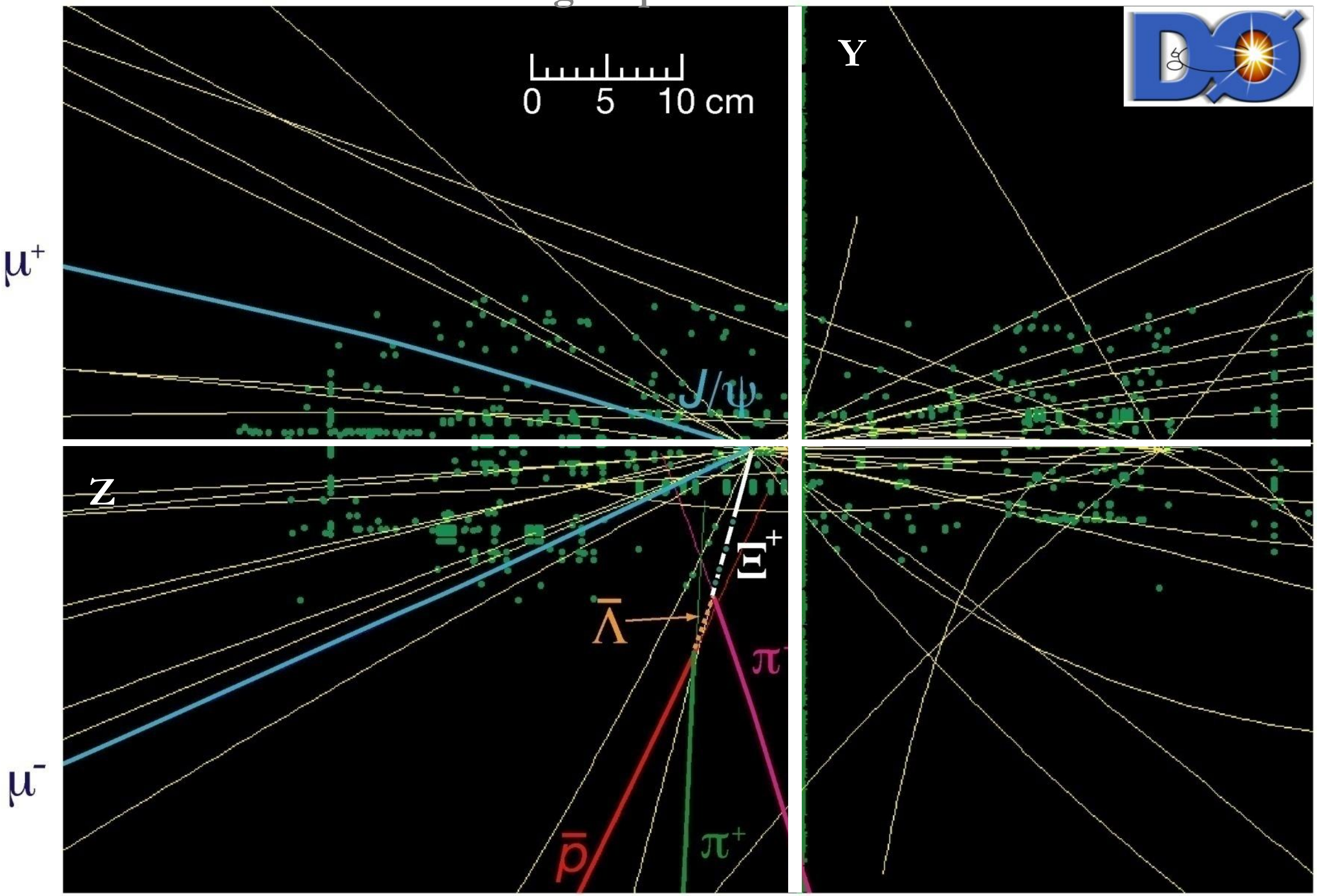
$\Xi^- \to \Lambda(p\pi^-)\pi^-$



Background events from wrong-sign combinations ($\Lambda(p\pi^-)\,\pi^+$)

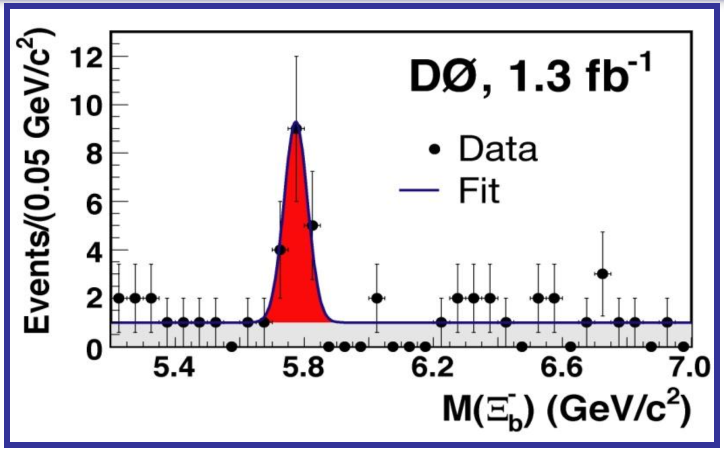


Event scan of event in the signal peak



Run 179200, Event 55278820, $M(\Xi_b)$ = 5.788 GeV

Mass measurement



Signal Significance:

$$\sqrt{-2\Delta \ln L} = \sqrt{-2\ln\left(\frac{L_B}{L_{S+B}}\right)} = 5.5\sigma$$

Number of events: 15.2 ± 4.4

Mass: 5.774 ± 0.011(stat) GeV

Width: 0.037 ± 0.008 GeV

Compare to width in MC:

0.035 ± 0.003 GeV

We also measured:

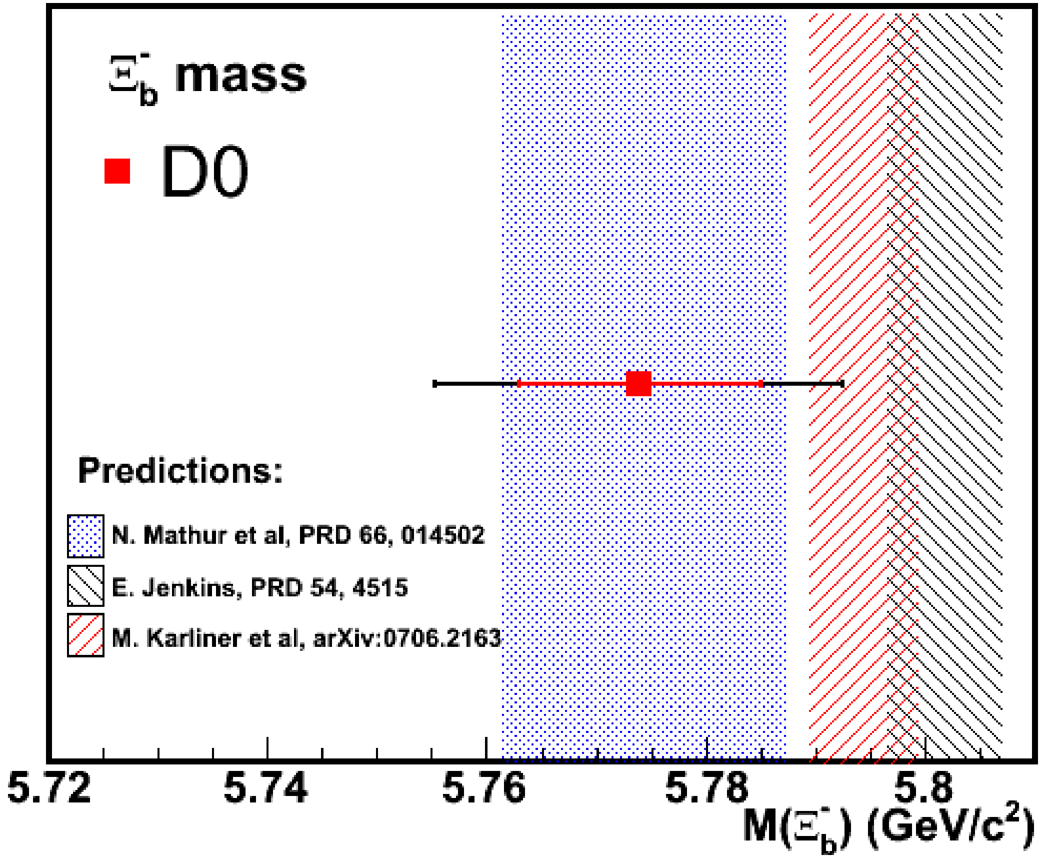
$$R = \frac{\sigma(\Xi_b^-)BR(\Xi_b^- \to J/\psi\,\Xi^-)}{\sigma(\Lambda_b)BR(\Lambda_b \to J/\psi\Lambda)}$$

$$R = 0.28 \pm 0.09\,(\text{stat}) + {}^{+0.09}_{-0.08}\,(\text{syst})$$

Source	Uncertainty (%)
Λ_b/Ξ_b hadronization models	Negligible
MC stat. on Λ_b /Ξ_b	10
pT(π) reconstruction	7
Effect of mass difference between data and MC	5
Λ_b/Ξ_b MC reweighting	**27**
Syst. uncertainties on the number of Ξ_b in data	+13, -3

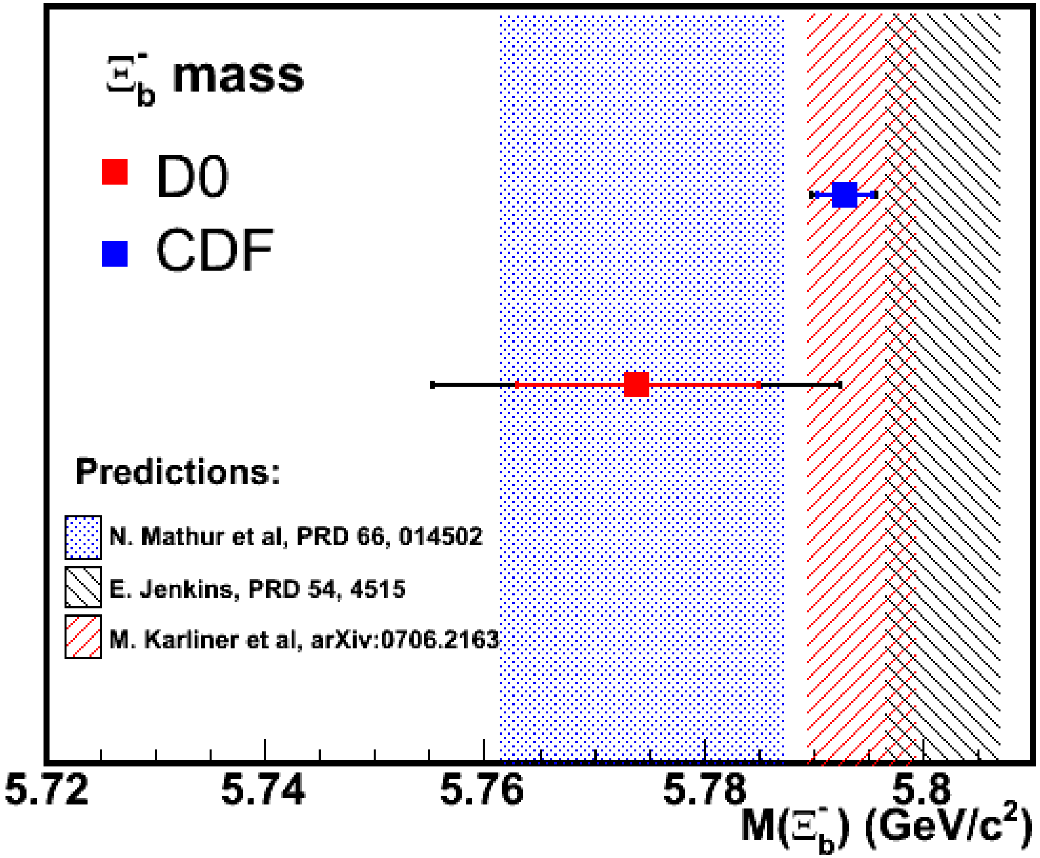
PRL 99, 052001 (2007)

Measurement vs. predictions



Predictions come from Lattice QCD, Heavy Quark Effective Theory, and potential models in NRQCD

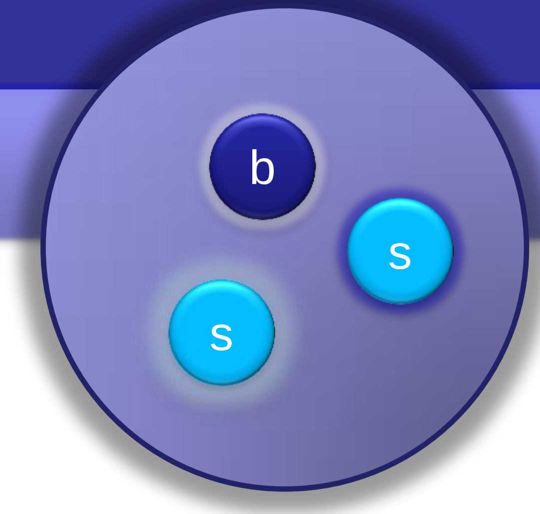
Measurement vs. predictions



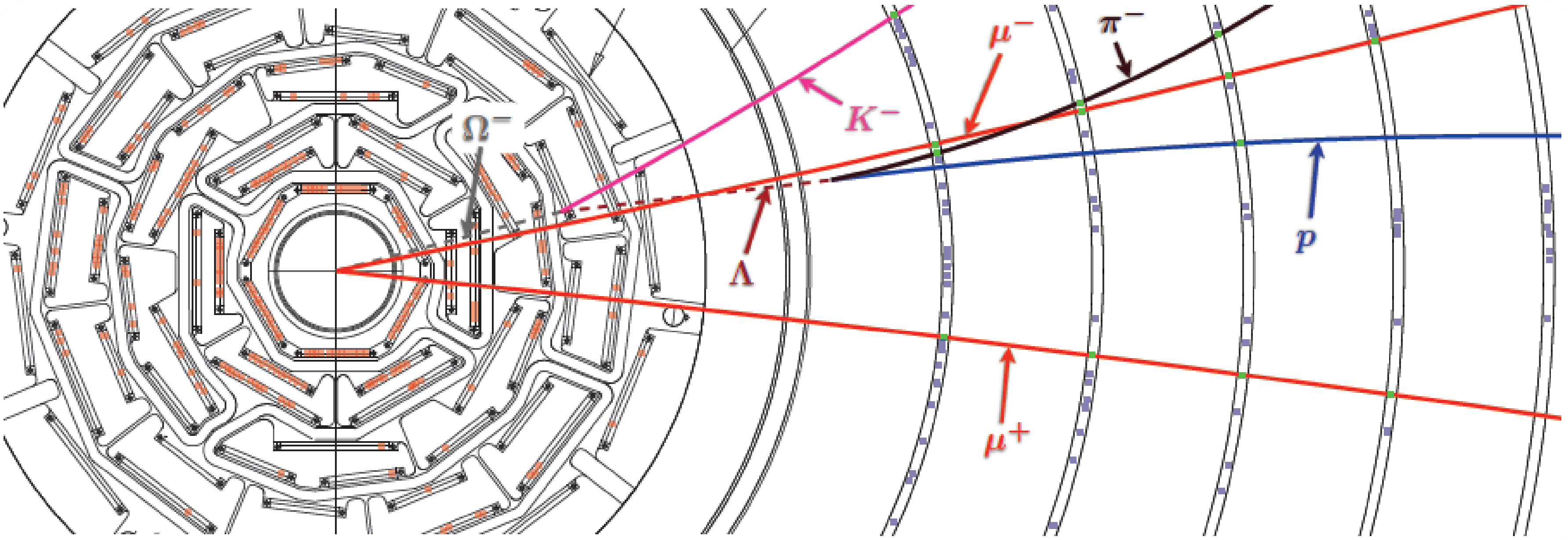
Two weeks after D0 paper submission, CDF submitted a PRL reporting their Ξ_b observation.

Mass measurements in both observations are consistent.

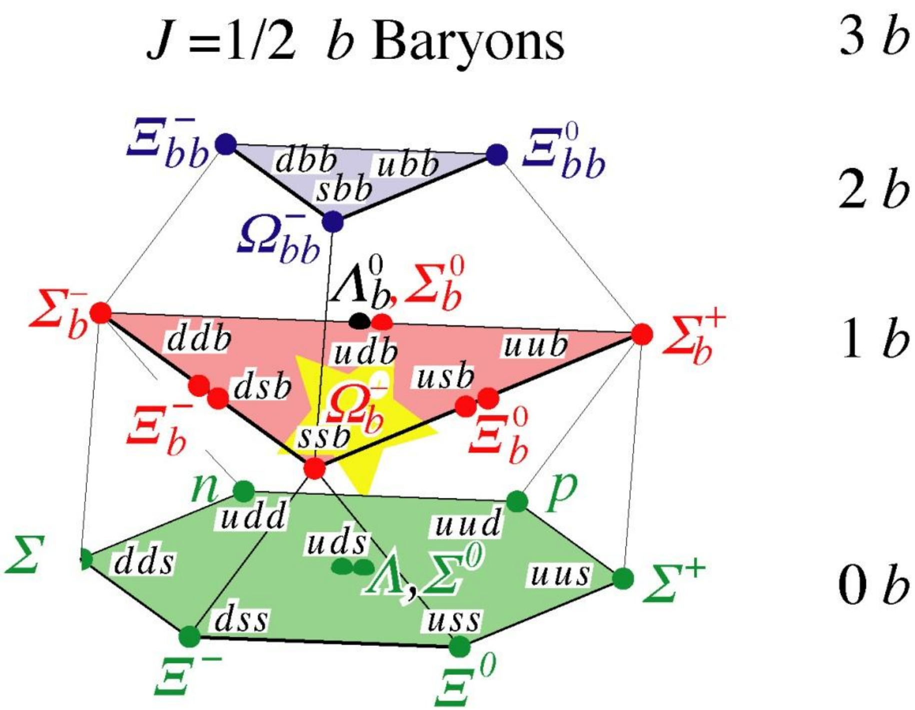
Discovery of the Ω^-_b(bss)



$$\Omega^-_b \rightarrow J/\psi + \Omega^-$$

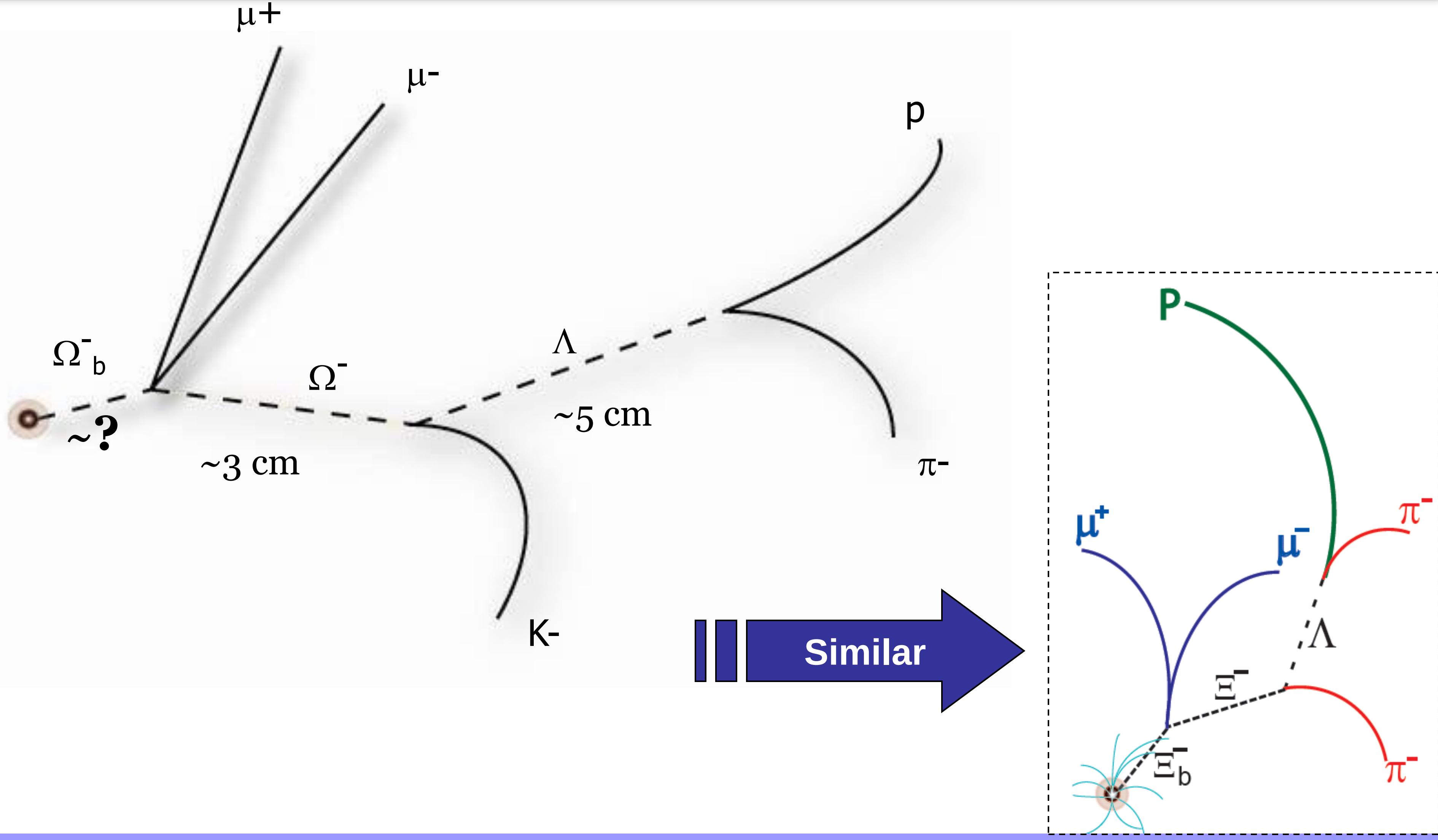


Search for the $\Omega^-_b(bss)$

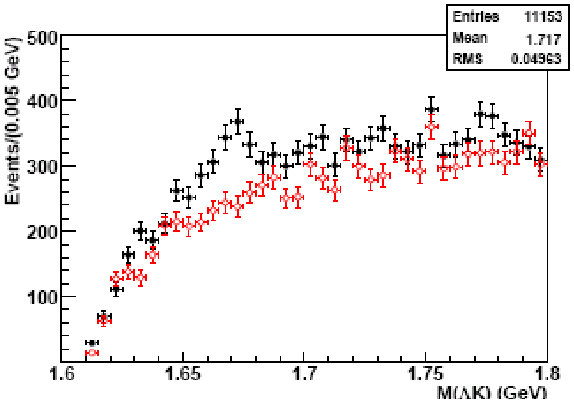


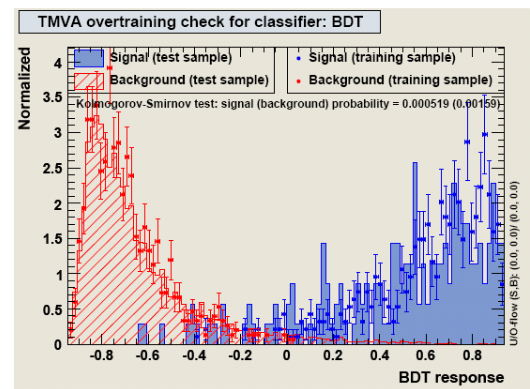
- *bss* quarks combination
- Mass is predicted to be 5.94 - 6.12 GeV
- $M(\Omega^-_b) > M(\Lambda_b)$
- Lifetime is predicted to be $0.83 < \tau(\Omega^-_b) < 1.67$ ps

How do we look for it?

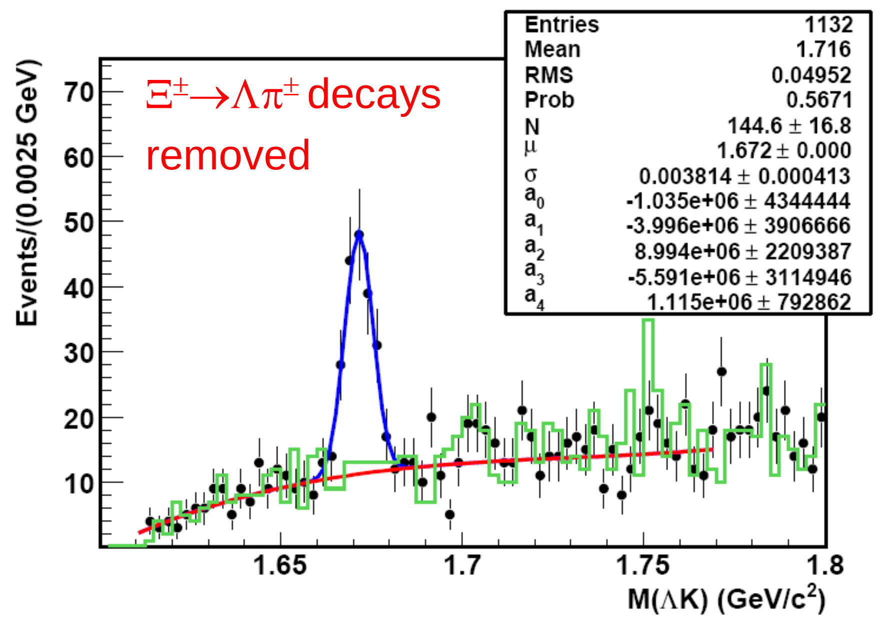


BDT to select $\Omega^- \to \Lambda K$ decays



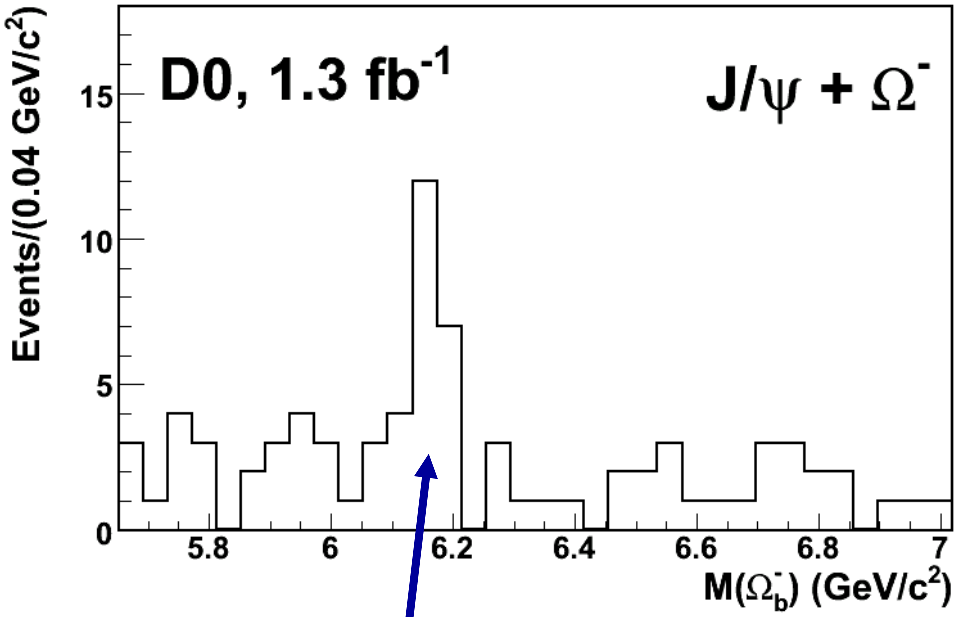


Variable description
Λ vertex χ^2
Λ collinearity
Λ lifetime significance
p track (from Λ) χ^2
p (from Λ) combined impact parameter significance
p track SMT hits
p track CFT hits
π track (from Λ) χ^2
π (from Λ) combined impact parameter significance
π track SMT hits
π track CFT hits
p (from Λ) p_T
π (from Λ) p_T
Λ transverse decay length
Error on Λ transverse decay length
Error on Ω^- transverse decay length
Ω^- transverse decay length
Ω^- collinearity
K^- (from Ω^-) p_T
K^- (from Ω^-) combined impact parameter significance



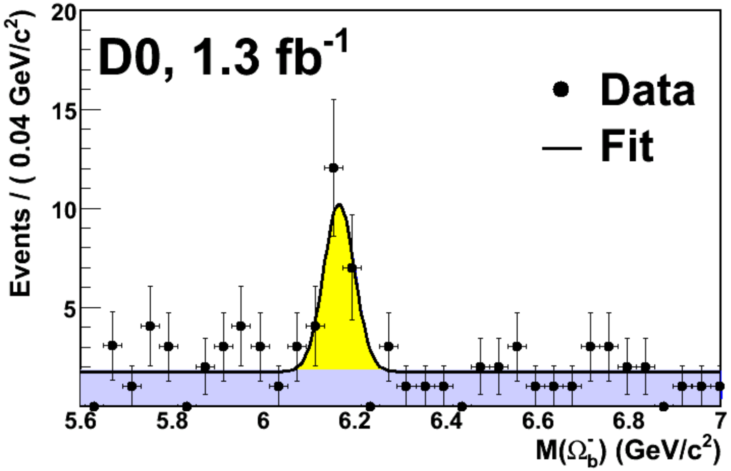
Looking at right-sign combinations

- After optimization:
  - σ_λ<0.03 cm
  - J/ψ and Ω in the same hemisphere
  - $p_T(J/\psi+\Omega)$>6 GeV
- Mass window for the search: 5.6 - 7 GeV



Clear excess of events near 6.2 GeV

Ω_b^- mass measurement



- Fit:
  - Unbinned extended log-likelihood fit
  - Gaussian signal, flat background
  - Number of background/signal events are floating parameters

N= 17.8 ± 4.9 (stat) ± 0.8(syst)

Mass: 6.165 ± 0.010(stat) ± 0.013(syst) GeV

Width fixed (MC): 0.034 GeV

$$\sqrt{-2\Delta \ln L} = \sqrt{-2\ln\left(\frac{L_B}{L_{S+B}}\right)} = 5.4\sigma$$

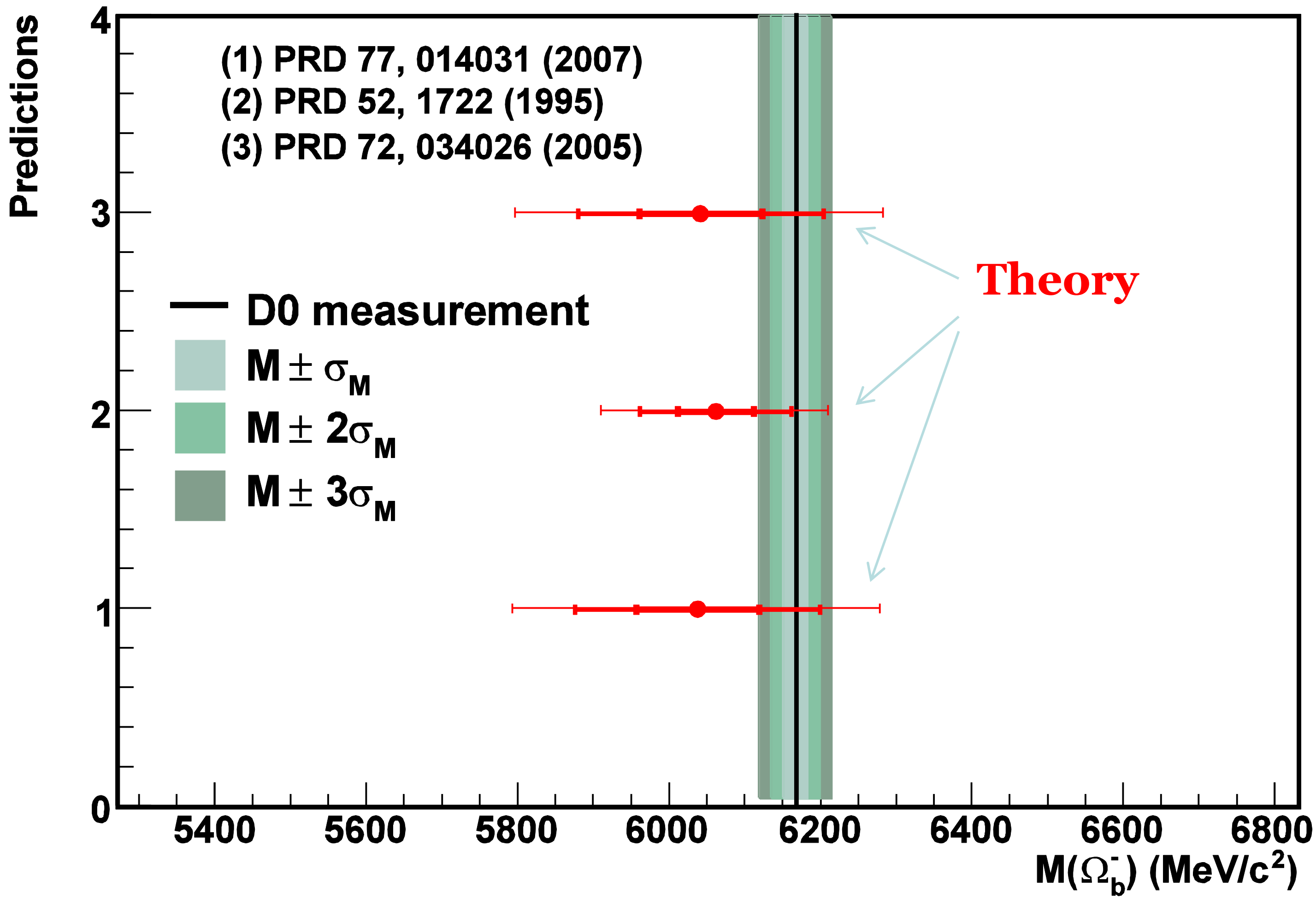
$$M(\Omega_b^-) = 6.165 \pm 0.010(\text{stat}) \pm 0.013(\text{syst}) \text{ GeV}$$

$$R = \frac{f(b \to \Omega_b^-) Br(\Omega_b^- \to J/\psi\, \Omega^-)}{f(b \to \Xi_b^-) Br(\Xi_b^- \to J/\psi\, \Xi^-)}$$

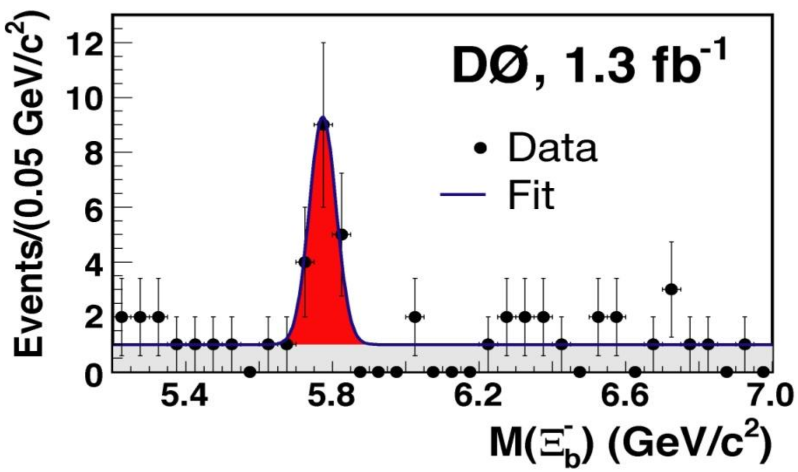
$$R = 0.80 \pm 0.32(stat)^{+0.14}_{-0.22}(syst)$$

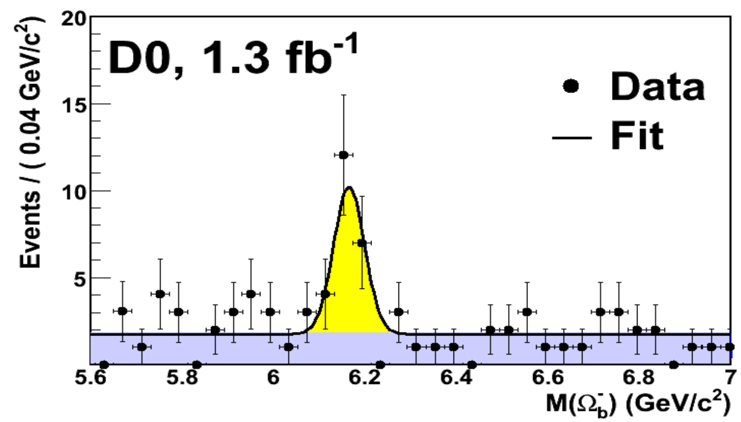
PRL 101, 232002 (2008)

Theory vs. Experiment



Two discoveries



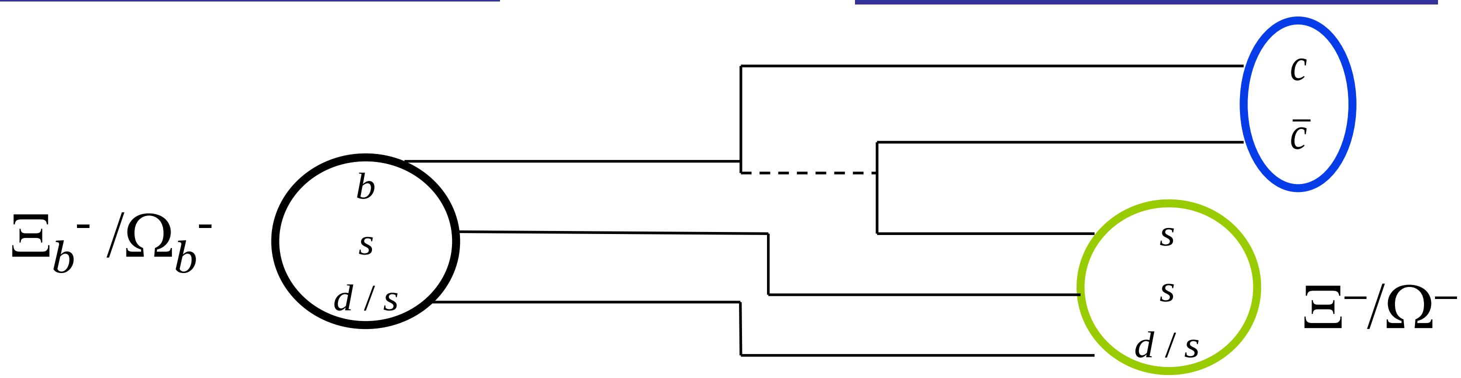


$$M(\Xi_b^-) = 5.774 \pm 0.011(\text{stat}) \pm 0.015(\text{syst})\ \text{GeV}$$

PRL 99, 052001 (2007)

$$M(\Omega_b^-) = 6.165 \pm 0.010(\text{stat}) \pm 0.013(\text{syst})\ \text{GeV}$$

PRL 101, 232002 (2008)



Other interesting results

Información: | Referencias (23) | Citas (110) | Ficheros | Gráficos

Evidence for an anomalous like-sign dimuon charge asymmetry.

D0 Collaboration (Victor Mukhamedovich Abazov (Dubna, JINR) *et al.*) *Mostrar todos los 449 autores*.

Jul 2010 - 7 pages

Phys.Rev.Lett. 105 (2010) 081801
DOI: 10.1103/PhysRevLett.105.081801
FERMILAB-PUB-10-217-E-PPD
e-Print: arXiv:1007.0395 [hep-ex] | PDF
Experiment: FNAL-E-0823, FNAL-TEV-D0

Abstract: We measure the charge asymmetry $A \equiv (N^{++} - N^{--})/(N^{++} + N^{--})$ of like-sign dimuon events in 6.1~fb $^{-1}$ of $p\bar{p}$ collisions recorded with the D0 detector at a center-of-mass energy $\sqrt{s} = 1.96$~TeV at the Fermilab Tevatron collider. From A we extract the like-sign dimuon charge asymmetry in semileptonic b-hadron decays: $\backslash\text{aslb} = -0.00957 \pm 0.00251\,(\text{stat}) \pm 0.00146\,(\text{sys})$. It differs by 3.2~standard deviations from the standard model prediction $\backslash\text{aslb}(\text{SM}) = (-2.3^{+0.5}_{-0.6}) \times 10^{-4}$, and provides first evidence of anomalous CP violation in the mixing of neutral B mesons.

Other interesting results

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Evidence for an anomalous like-sign dimuon charge asymmetry.

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DOI: 10.1103/PhysRevLett.105.081801
FERMILAB-PUB-10-217-E-PPD
e-Print: arXiv:1007.0395 [hep-ex] | PDF

Primary authors: G. Borissov and B. Hoeneisen.
3
DØ Note: 5997 Version: 3.4 April 16, 2010.

Measurement of the like-sign dimuon charge asymmetry with the D0 detector

(Dated: April 16, 2010)

We measure the charge asymmetry A of like-sign dimuon events in approximately 6.1 fb^{-1} of proton-antiproton collisions recorded with the D0 detector at a center-of-mass energy $\sqrt{s} = 1.96$ TeV at the Fermilab Tevatron proton-antiproton collider between 2002 and June 2009. From A we derive the like-sign dimuon charge asymmetry of semileptonic b-hadron decays: $A^b_{\rm sl} = xxxxx \pm 0.0025$ (stat) $\pm$ 0.0014 (syst). This result differs from the standard model prediction by xxxx standard deviations.

PACS numbers: 13.25.Hw; 14.40.Nd

Other interesting results

Información: | Referencias (18) | Citas (43) | Ficheros | Gráficos

Observation of the B_c Meson in the Exclusive Decay $B_c \to J/\psi\pi$.

D0 Collaboration (V.M. Abazov (Dubna, JINR) *et al.*) *Mostrar todos los 534 autores*.

Feb 2008 - 6 pages

Phys.Rev.Lett. 101 (2008) 012001
DOI: 10.1103/PhysRevLett.101.012001
FERMILAB-PUB-08-047-E
e-Print: arXiv:0802.4258 [hep-ex] | PDF
Experiment: FNAL-E-0823, FNAL-TEV-D0

Abstract: A fully reconstructed Bc --> Jpsi Pi signal is observed with the D0 detector at the Fermilab Tevatron p-pbar collider. Using 1.3 inverse femtobarns of integrated luminosity, the signal is extracted with a significance more than five standard deviations above background. The measured Bc meson mass is 6300 (+-) 14 (stat) (+-) 5 (sys) MeV/cc

Other interesting results

Información: | Referencias (18) | Citas (43) | Ficheros | Gráficos

Observation of the B_c Meson in the Exclusive Decay $B_c \to J/\psi\pi$.

D0 Collaboration (V.M. Abazov (Dubna, JINR) *et al.*) Mostrar todos los 534 autores.

Feb 2008 - 6 pages

Reconstruction of the Decay

$B_c \longrightarrow J/\psi + \pi$

DØnote n. 5511 – v1.4

Arthur Maciel (CBPF - Rio)

February 4, 2008

Abstract

A presentation of the data selection (*RunIIa*, 1.3fb^{-1}) leading to the isolation of the fully reconstructed ($B_c \to J/\psi + \pi$) hadronic final state. With a signal significance higher than five standard deviations above background, the B_c measured mass is $6300 \pm 14 \pm 5$ MeV/c^2.

n p-
ed
ore
(sys)

Small details … the last D0 run

Highly selected crew for last DZero run … last Tevatron store.

Latin-American groups in Dzero:

“Overall I evaluate participation of latin-american groups in DZero as major success: many projects accomplished, many papers published, many presentations at prestigious conferences. What can I recommend to improve - hardware/detector experience is still on a lower side, so you need centers (like national Labs) where such developments are supported (hard to do at Universities). Some groups had very few postdocs/students - it will help to have more - such experiments as DZero is a great training ground.”

Dmitri Denisov
Spokesman of DZero

Tevatron … 28 years of success

for Latin-America

Challenges

- ????