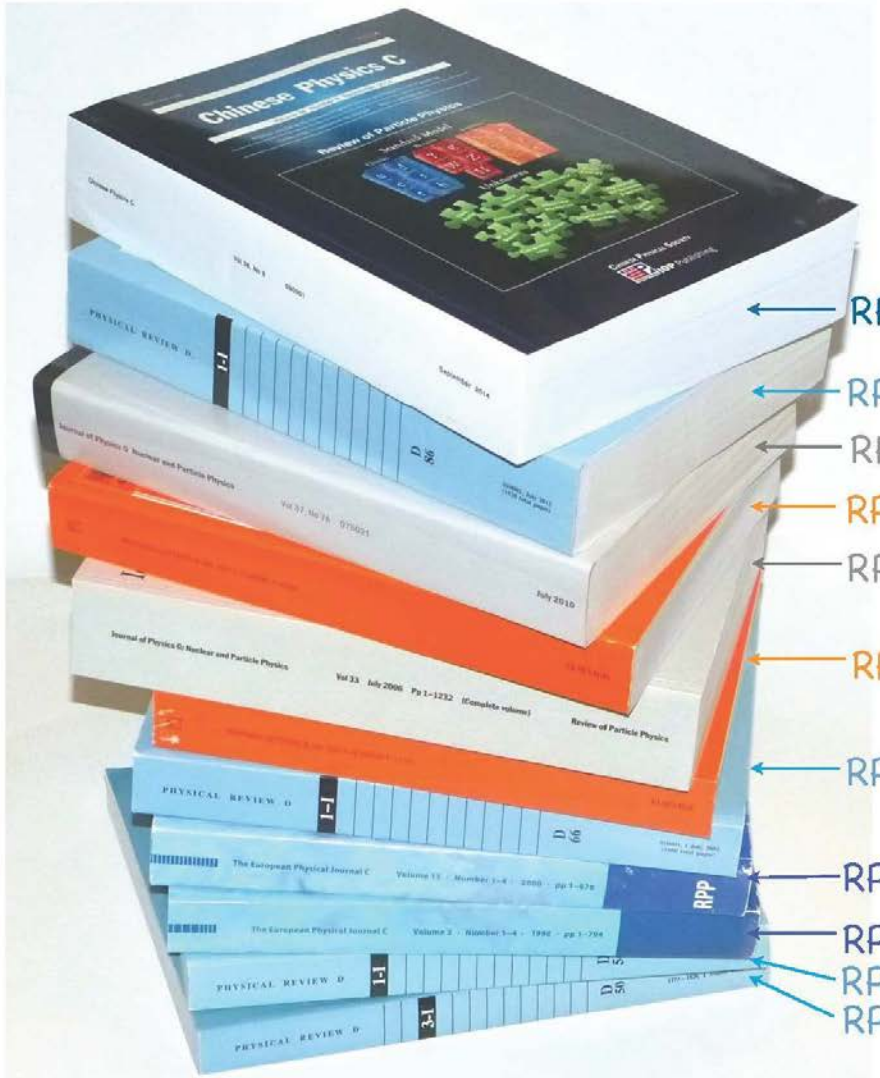
Particle Data Group

Now 57 years

November 2014


PDG work requires precision and timing!



Pages/kg

RPP14: 1676 pages 3.23 kg | 522

RPP12: 1526 pages 2.86 kg | 533

RPP10: 1422 pages 2.90 kg | 489

RPP08: 1340 pages 2.36 kg | 580

RPP06: 1232 pages 2.49kg | 494

RPP04: 1106 pages 1.63 kg | 679

RPP02: 974 pages 1.48 kg | 657

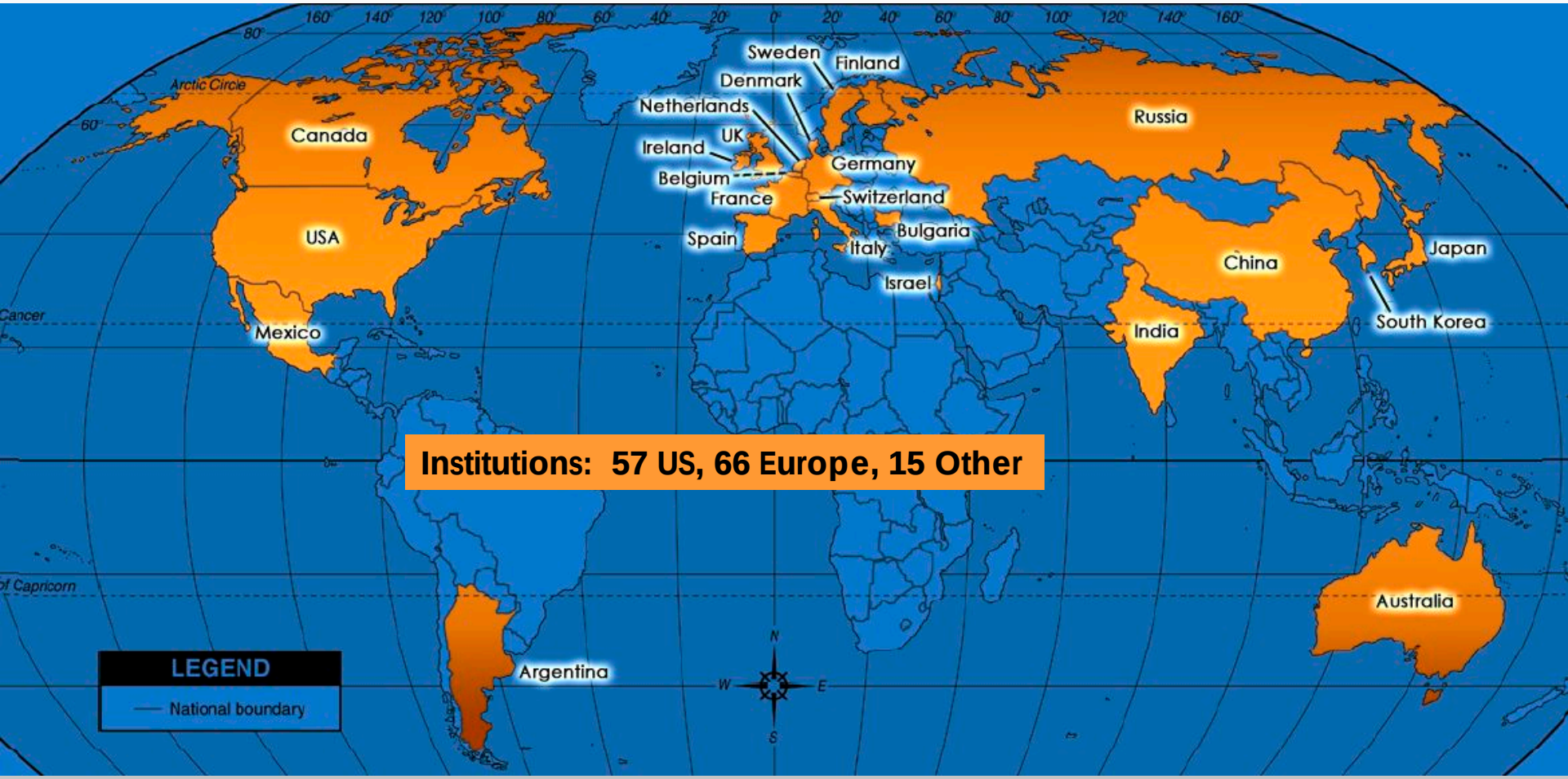
RPP00: 878 pages 1.77 kg | 493

RPP98: 794 pages 1.49 kg | 534

RPP96: 720 pages 1.18 kg | 610

RPP94: 656 pages 1.11 kg | 589

The PDG Empire



Institutions: 57 US, 66 Europe, 15 Other

Collaboration

Particle Data Group collaboration

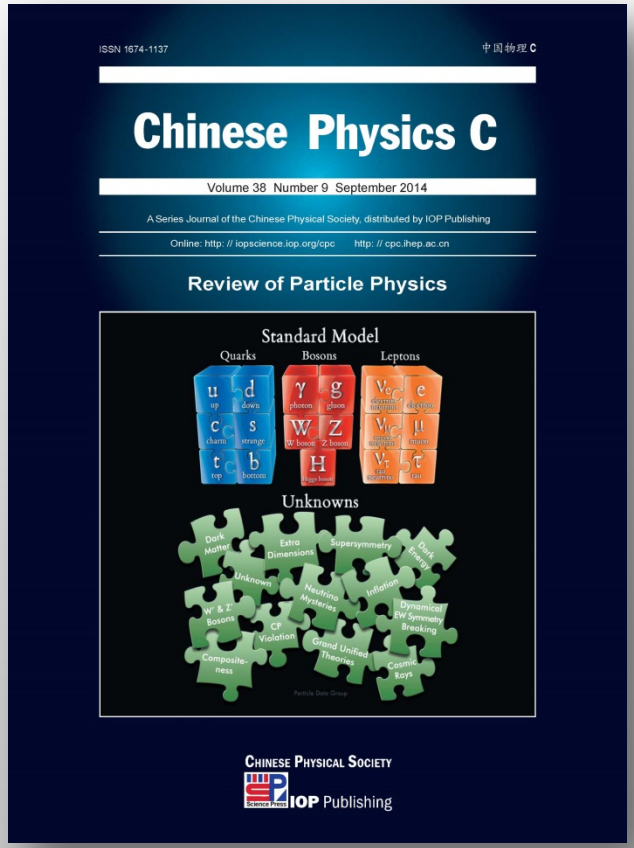
of 206 authors

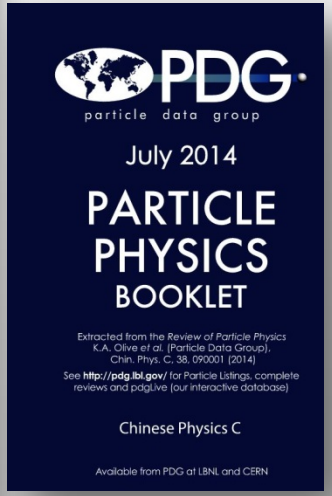
from 24 countries and 140 institutions

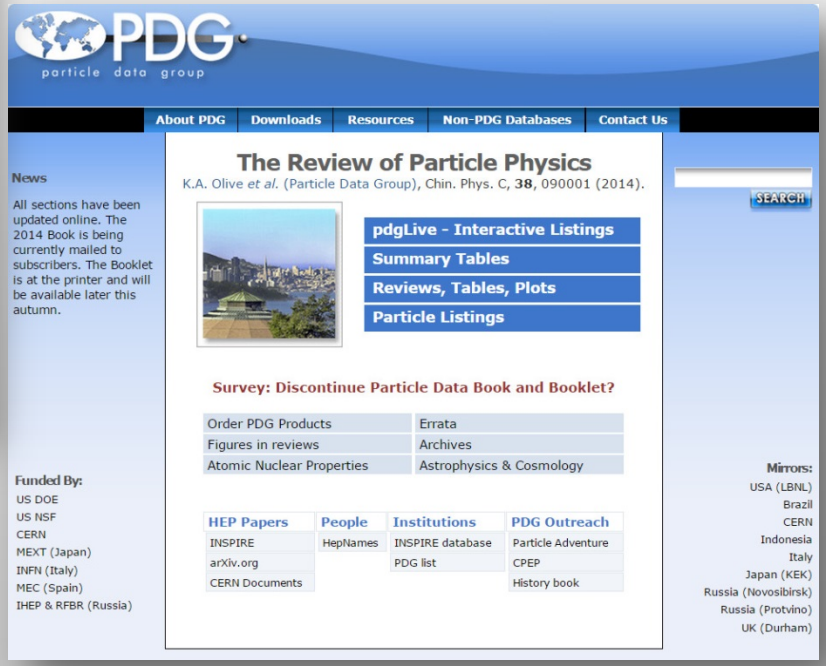
+ 700 consultants in the HEP community

Review of Particle Physics

2014 Edition (book, booklet, web, pdgLive)







Highlights in Listings

899 new papers with 3283 new measurements.

330 LHC papers: ATLAS, CMS, and LHCb

Extensive Higgs boson coverage from 138 papers with 258 measurements.

Supersymmetry: 123 papers with major exclusions, many from LHC experiments.

Latest from B-meson physics: 183 papers with 803 measurements, including first observation of Bs → μ+μ− from LHCb and CMS.

Cosmology reviews updated to include 2013 Planck.

Updated and new results in neutrino mixing on Δm^2 and mixing angle measurements, including the first Δm_{32}^2 from reactor experiment.

72 new top results since 2012, many from LHC experiments.

Final assignment of 1++ quantum numbers to the X(3872) by LHCb.

Observation of charmonium-like states X(3900) and X(4020) (BESIII and BES3).
Observation of bottomonium-like states X(10620) and X(10650) (Belle).

Heavily revised Atomic- Nuclear Properties website.

112 reviews
(most are revised or new)

New reviews on:

- Higgs Boson Physics
- Dark Energy
- Monte Carlo Neutrino Generators
- Resonances

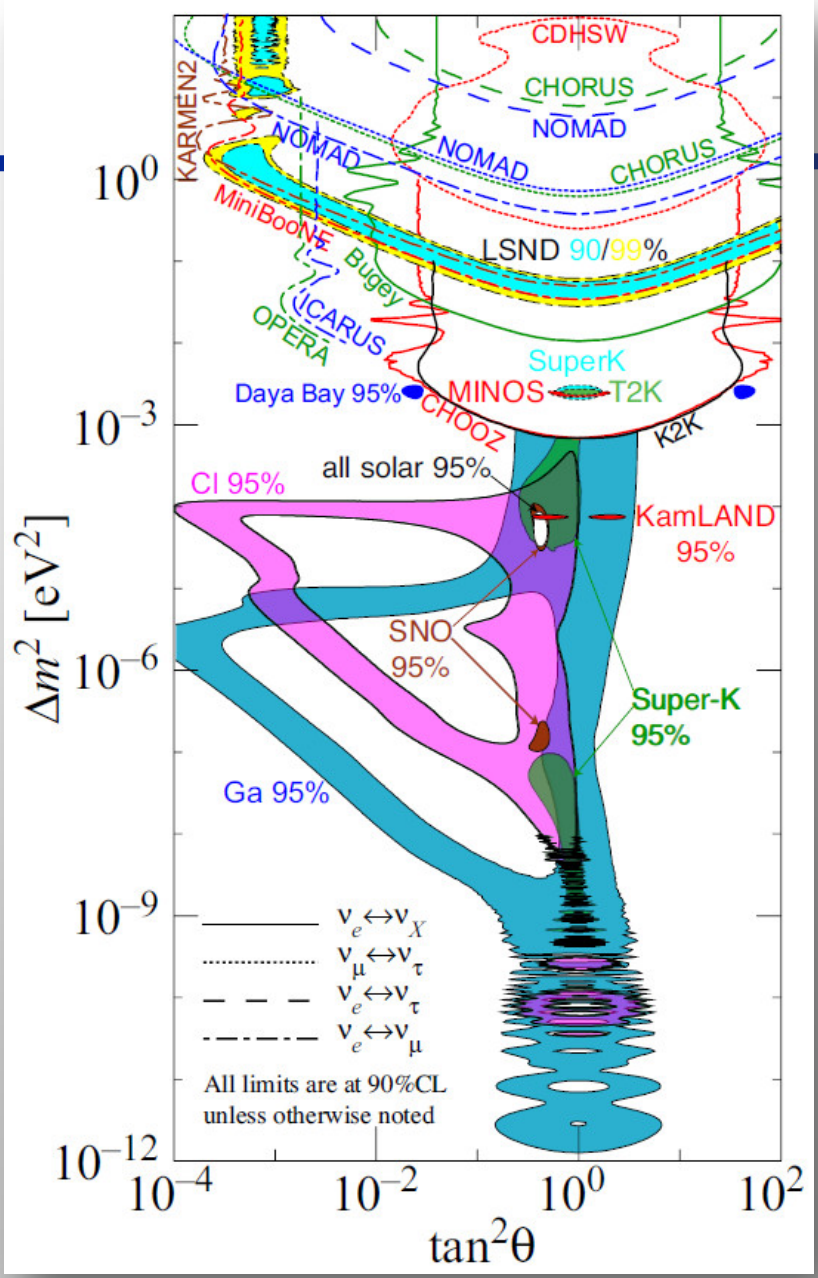
Significant update/revision to reviews on:

- Top Quark
- Dynamical Electroweak Symmetry Breaking
- Astrophysical Constants
- Dark Matter
- Big-Bang Nucleosynthesis
- Neutrino Cross Section Measurements
- Accelerator Physics of Colliders
- High-Energy Collider Parameters
- Total Hadronic Cross Sections Plots

A Highlight

Latest plot shows large mixing of neutrinos

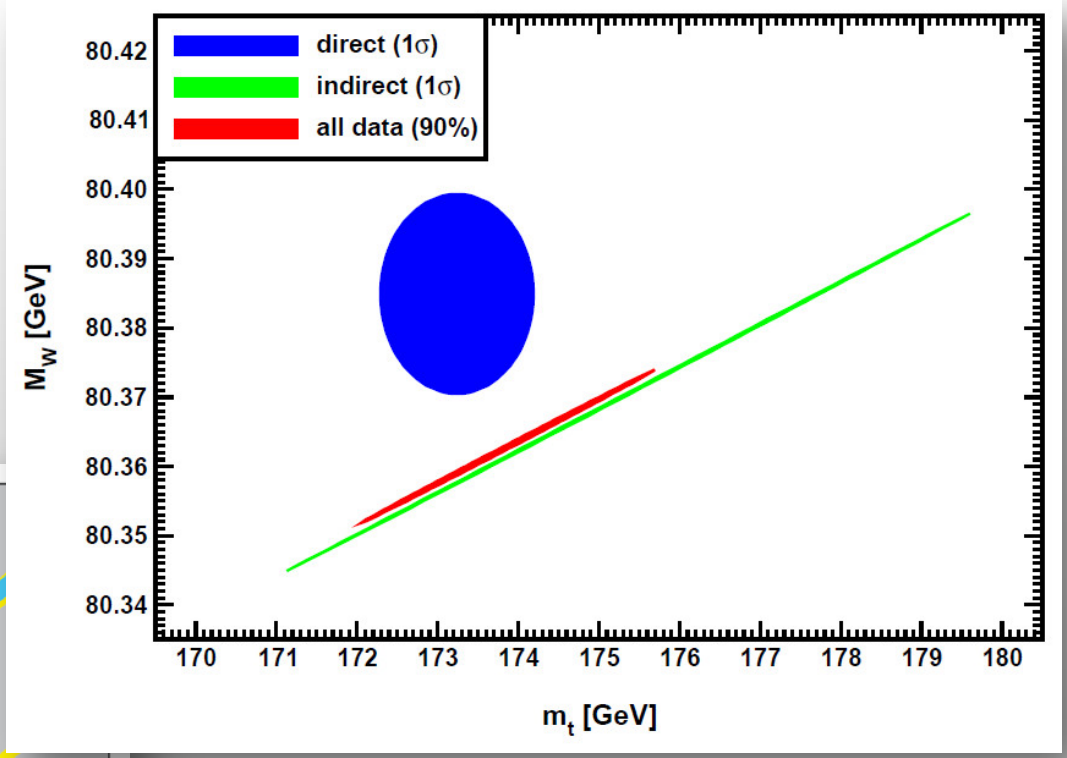
Is this now too complex to be useful ?



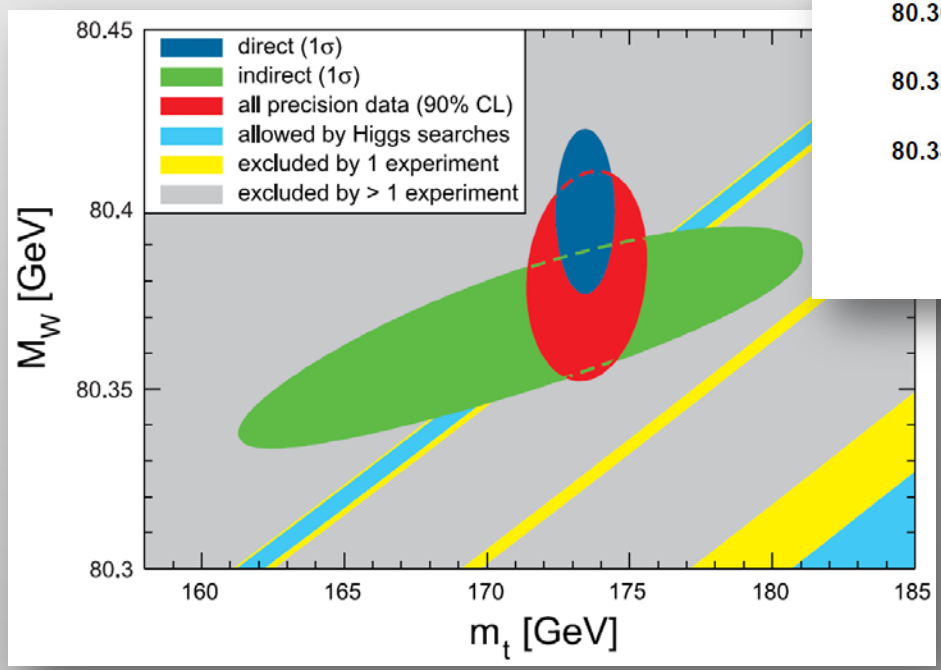
Hitoshi Murayama

Electroweak fit

2014

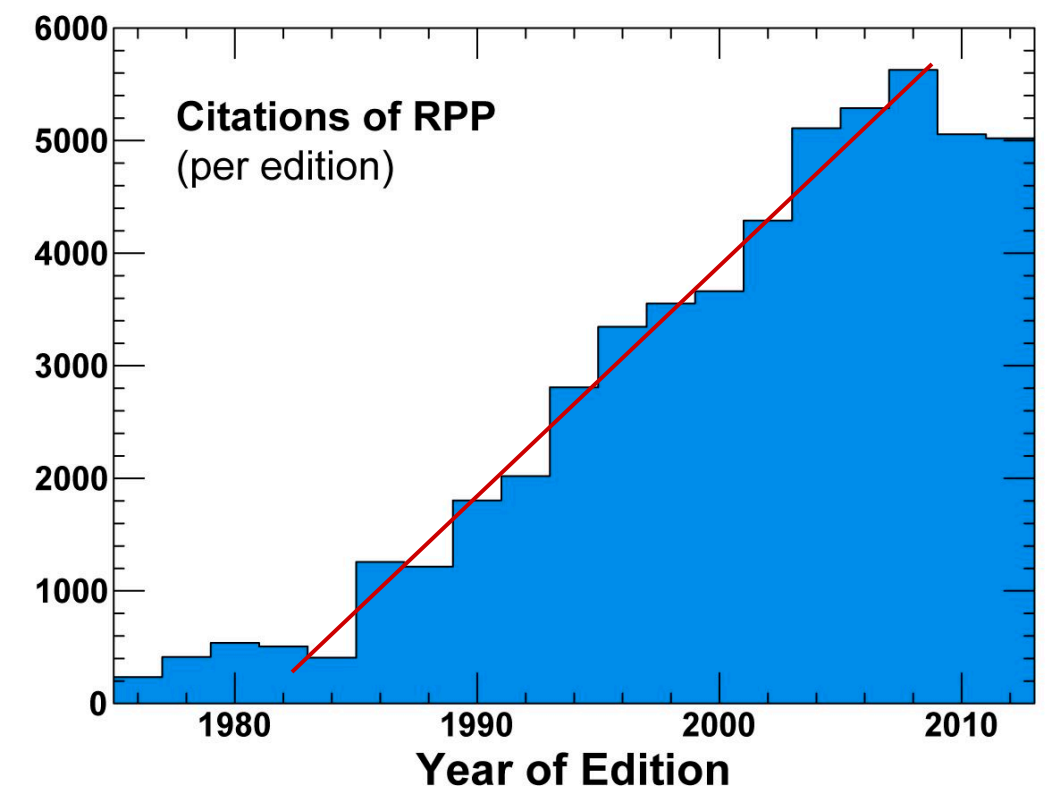


2012



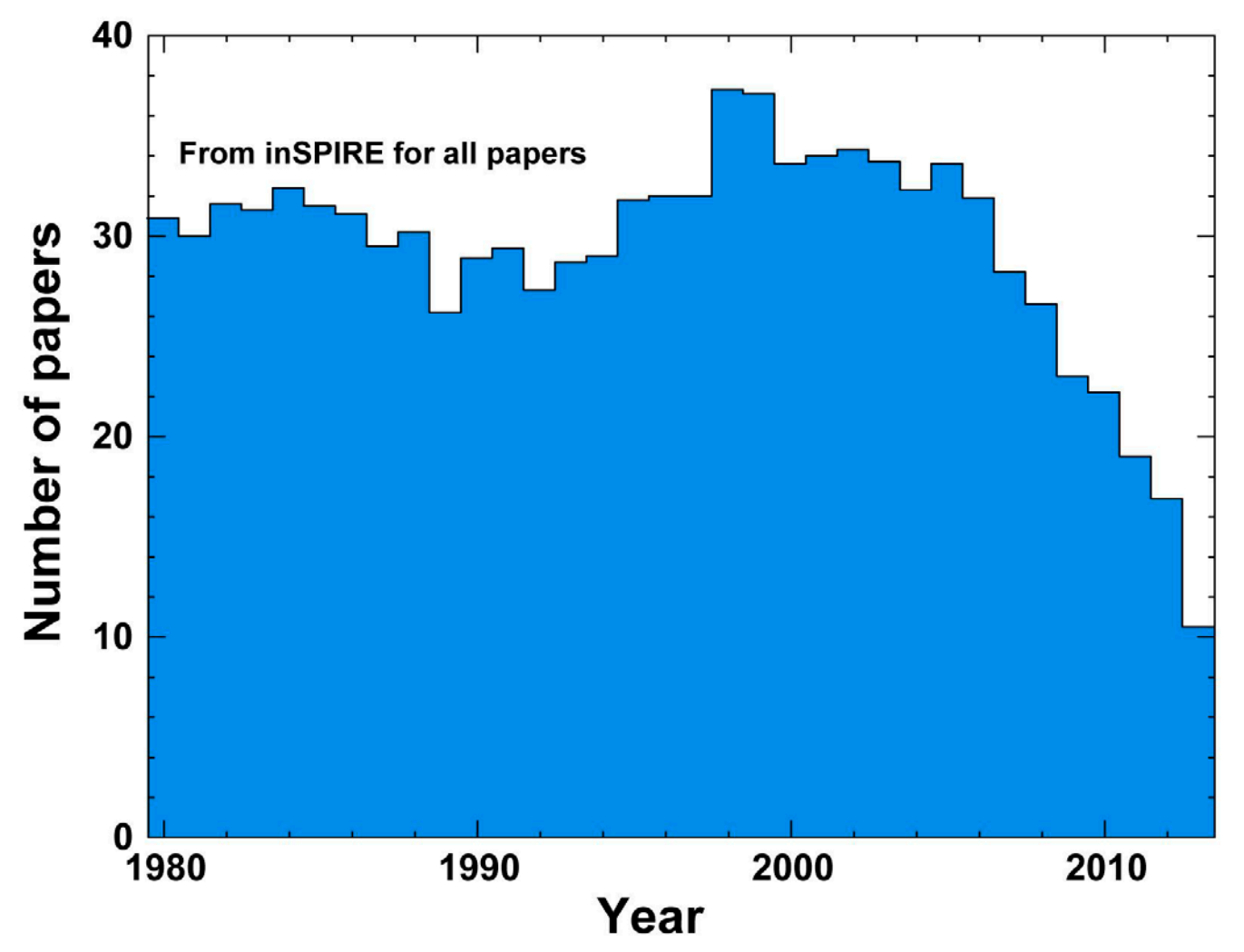
Top Cited

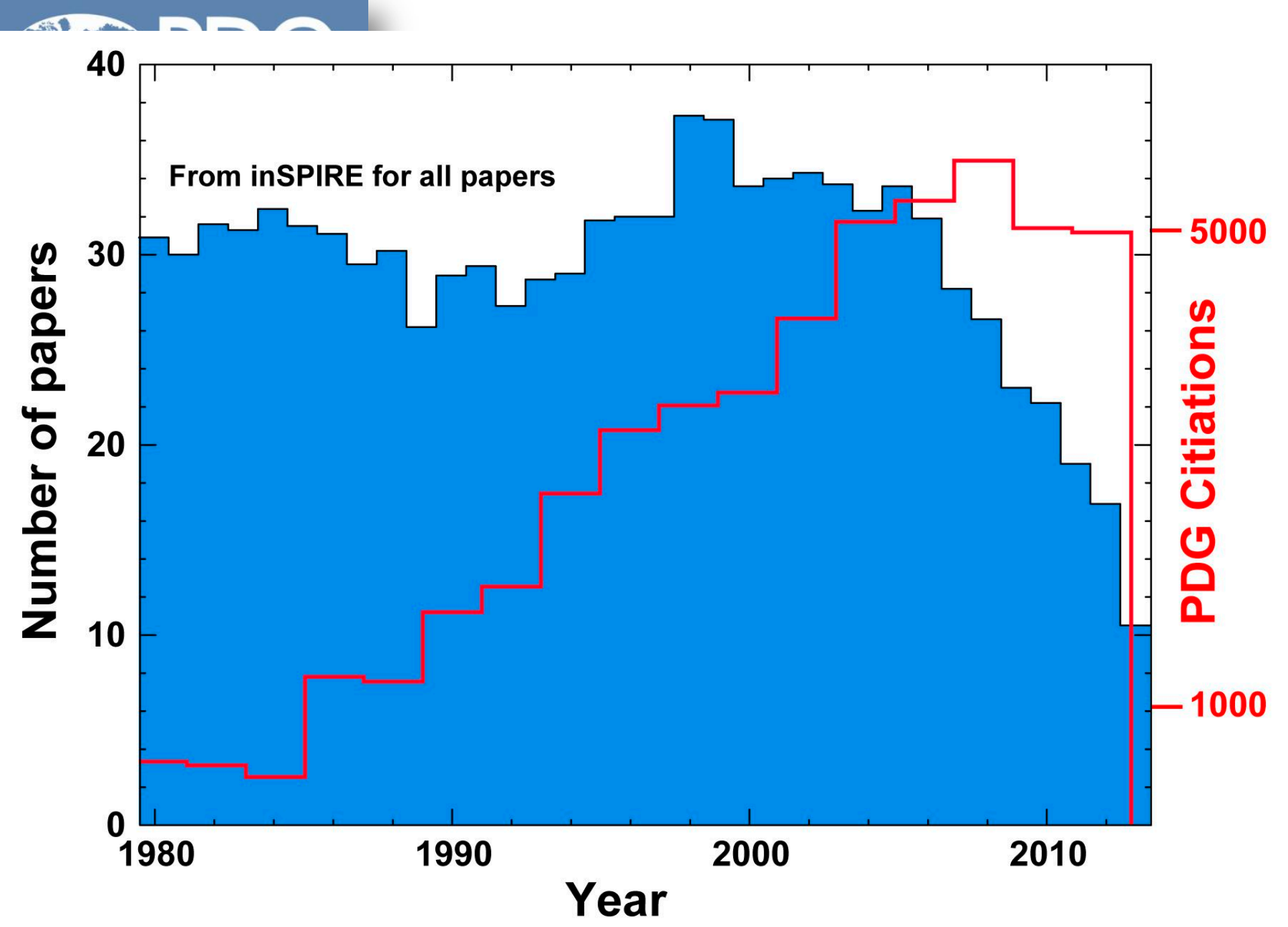
The Review is the all-time top cited article in High Energy Physics with more than 51,000 citations (INSPIRE)



★ Citations increase for years after an edition is published

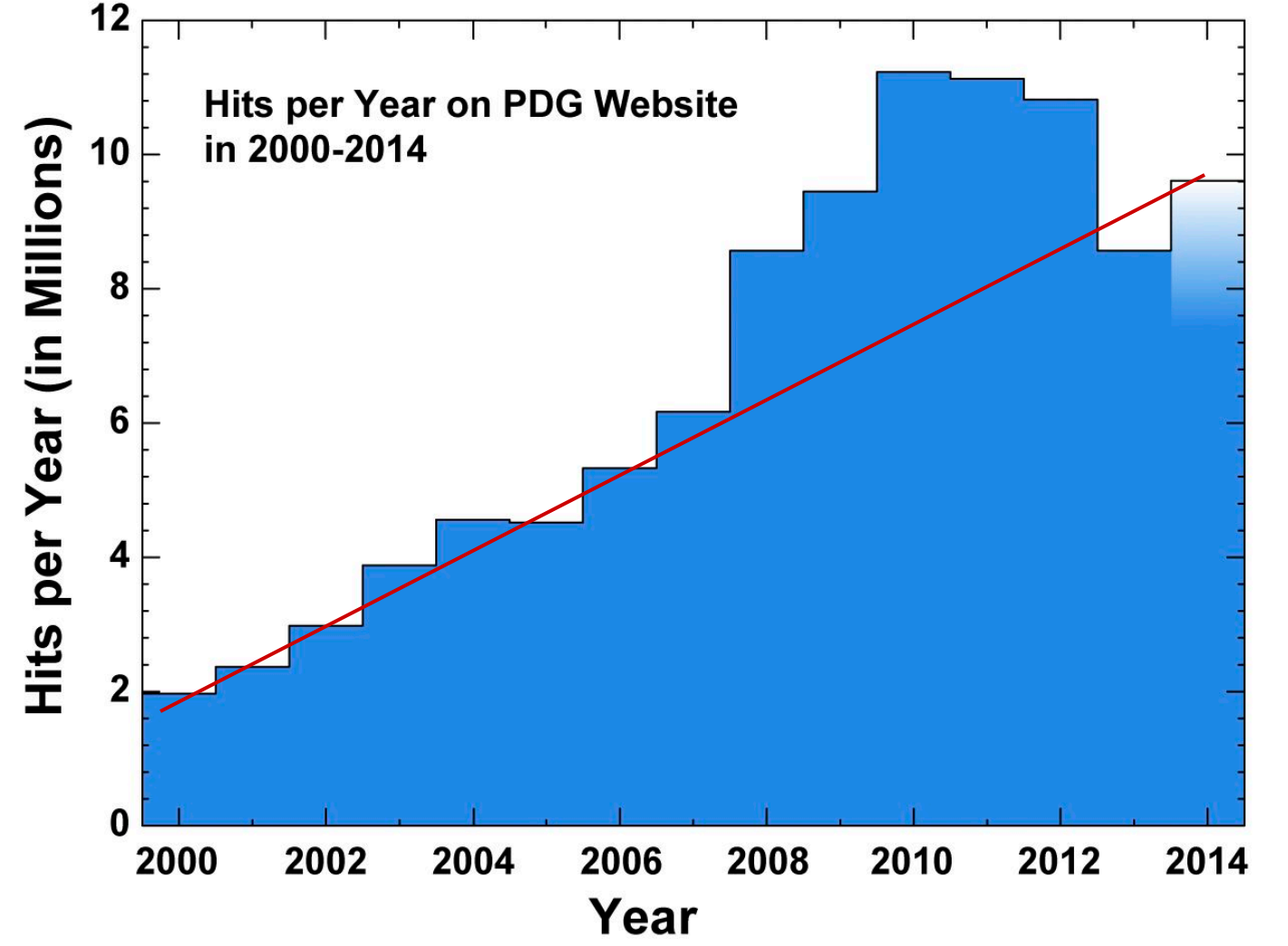
Top Cite. Is this just citation inflation? No.




From inSPIRE for all papers
Number of papers
Year
PDG Citiations
0
10
20
30
40
1980
1990
2000
2010
1000
5000

Web Usage

Excluding mirror sites and excluding education webpages



PDG Printed Products

- ***Review of Particle Physics***

  14,000 copies of 1675-page book

- ***Particle Physics Booklet***

  32,000 copies of 328-page booklet

- ***Pocket Diary for Physicists***

  17,000 copies ⇨ DROPPED due to lack of funding.

PDG Survey on Printed Products

At the 2012 Advisory Committee, we proposed a survey on the future of the Book and Booklet.
(The Diary was discontinued due to budget cuts).

An amazing 6172 readers responded, demonstrating the very high value our community places on PDG products (and 1491 comments).

(We sent out one email; no reminders).

PDG Survey on Book, Booklet and APP

Comparing surveys in 2000 and in 2014

THE QUESTION: Is having a copy of the full-sized book (booklet) essential to your work or study?

Yes, it is essential.
No, I do not need it.
Having the full-size book is useful, but I could live without it or live with a reduced book.

TOTAL Responses: 2450 in 2000 and 6172 in 2014

Reader Comments: 1226 in 2000 and 1491 in 2014

PDG Survey on Book, Booklet and APP

2000	2014	PREFERENCE FOR BOOK (in %)
9	32.1	Not needed
----	26.1	Satisfied with reduced book (not asked in 2000)
52	23.5	Like but could do without
39	18.4	I need the book

BOOK	BOOKLET	PREFERENCE in 2014 (in %)
32.1 ⟺	18.5	Not needed
26.1	29.9	Satisfied with reduced book(let)
23.5	18.4	Like but could do without
18.4	33.2	I need the book(let)

To be discussed later.

PDG App(s)

Two thirds of respondents said app was either important or very important. (6172 respondents)

Comments from survey were emphatic:

Reduced printed products are dependent on producing replacement app(s).

PDG App(s)

- ***Summary Tables***

  Basically easy;

  just formatting for readability

- ***Review articles***

  Even easier except for formatting tables

- ***pdgLive***

  Not easy. Major programming to connect to database and to present on-the-fly.

  Proposal to DOE was tabled so far.

2014 Edition of *Review*

- **3283 new measurements from 899 new papers**
  (of total 32,000 measurements and 9000 papers).

- **112 reviews with many exciting and new features**

- **Important new data in areas such as**
  Higgs, SUSY, neutrinos, top quark, B physics, etc.

★ **Color Figures everywhere**

Listings and Reviews

The Web allows us to see what most interest our readers.

The hits (page views) on

Data Listings = Reviews

almost exactly equal.

Clearly people care about both.

Astrophysics & Cosmology

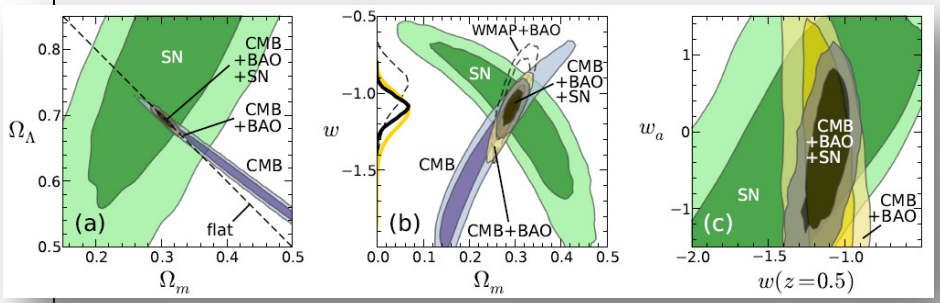
14 years ago: Very little

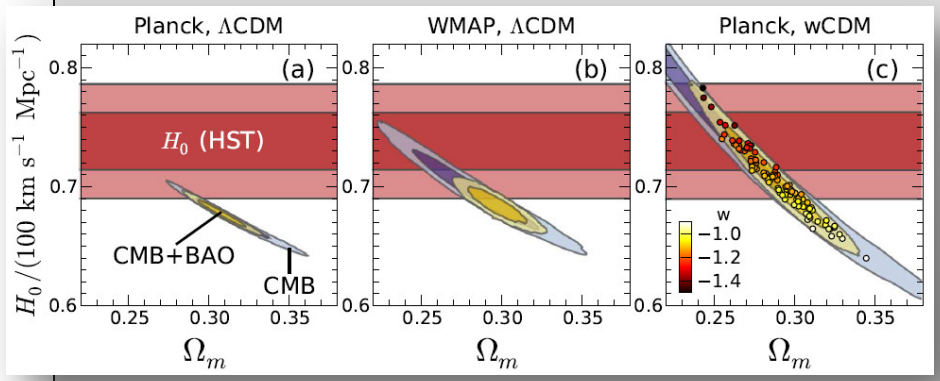
Now:

(downloads)

- Astrophysical Constants 5100
- Big Bang Cosmology 6300
- Cosmological Parameters: H_0, Λ, Ω, etc. 11300
- Experimental Tests of Gravitational Theory 3300
- Dark Matter 7200
- Dark Energy 6800
- Cosmic Background Rad. 4800
- Big Bang Nucleosynthesis 3500

(downloads)





(from Dark Energy review)

B Meson Section 1984

Entire section was <u>one</u> page

$B^{\pm}$, B^0, B

$B^{\pm}$

41 CHARGED B(5271, JP=) I=

SEE ALSO THE LISTING FOR THE B (FOLLOWING THE ENTRY FOR THE NEUTRAL B) FOR MEASUREMENTS WHICH DO NOT IDENTIFY THE CHARGE STATE.

41 CHARGED B MASS (MEV)

M	A	6	5270.8	3.0	BEHRENDS 83 CLEO +- D*- PI+ PI+ + CC		4/83*
M	A	STATISTICAL (2.3 MEV) AND SYSTEMATICAL (2.0 MEV) ERRORS COMBINED.					4/83*

41 CHARGED B PARTIAL DECAY MODES

		DECAY MASSES
P1	B+ INTO DOBAR PI+	1865+ 140
P2	B+ INTO D*(2010)- PI+ PI+	2007+ 140+ 140

B- MODES ARE CHARGE CONJUGATES OF THE ABOVE MODES.

41 CHARGED B BRANCHING RATIOS

R1	B+ INTO DOBAR PI+				(P1)		
R1	2	0.042	0.042	BEHRENDS	83 CLEO +- E+ E-, UPSIL(4S)		4/83*
R2	B+ INTO D*(2010)- PI+ PI+				(P2)		
R2	6	0.048	0.030	BEHRENDS	83 CLEO +- E+ E-, UPSIL(4S)		4/83*

REFERENCES FOR CHARGED B

BEHRENDS 83 PRL 50 881 + (ROCH+RUTG+SYRA+VAND+CORN+ITHA+HARV+OSU)

B^0

42 NEUTRAL B(5274, JP=) I=

SEE ALSO THE LISTING FOR THE B (FOLLOWING THIS ENTRY) FOR MEASUREMENTS WHICH DO NOT IDENTIFY THE CHARGE STATE.

42 NEUTRAL B MASS (MEV)

M	A	5	5274.2	2.8	BEHRENDS 83 CLEO 0 D*- PI+ + CC		4/83*
M	A	STATISTICAL (1.9 MEV) AND SYSTEMATICAL (2.0 MEV) ERRORS COMBINED.					4/83*

42 (B0) - (B+) MASS DIFFERENCE (MEV)

DM	A		3.4	3.6	BEHRENDS 83 CLEO E+E-, UPSIL(4S)		3/84*
DM	A	STATISTICAL (3.0) AND SYSTEMATICAL (2.0) ERRORS COMBINED.					3/84*

39 B PARTIAL DECAY M

P1	B INTO ELECTRON NEUTRINO HADRONS
P2	B INTO MUON NEUTRINO HADRONS
P3	B INTO E+ E- ANYTHING
P4	B INTO MU+ MU- ANYTHING
P5	B INTO KAON ANYTHING
P6	B INTO J/PSI ANYTHING
P7	B INTO D0 ANYTHING
P8	B INTO PROTON ANYTHING
P9	B INTO LAMBDA ANYTHING

39 B BRANCHING RATIO

R1	B INTO (ELECTRON NEUTRINO HADRONS)				
R1	A	(0.13)	(0.042)		BEB
R1	B	(0.136)	(0.039)		SPE
R1	C	0.127	0.021		CHA
R1	D	0.132	0.016		KLO
R1	E	(0.116)	(0.027)		NEL
R1	A	THE STATISTICAL AND SYSTEMATIC ER			
R1	B	THE STATISTICAL AND SYSTEMATIC ER			
R1	AB	THE ELECTRON ENERGY SPECTRA IN BO			
R1	AB	B-TO-C OVER B-TO-U QUARK TRANSITI			
R1	C	THE STATISTICAL AND SYSTEMATIC ER			
R1	D	STATISTICAL AND SYSTEMATIC ERRORS			
R1	D	RATIO CS(B-->E NU UP)/CS(B-->E NU			
R1	E	THE STATISTICAL AND SYSTEMATIC ER			
R1					
R1		ONLY THE EXPERIMENTS AT THE UPSIL			
R1					
R1					
R1	AVG	0.130	0.013	AVERAGE	
R2	B INTO (MUON NEUTRINO HADRONS)/TOT				
R2		(0.094)	(0.036)		CHA
R2	A	(0.105)	(0.020)		ADE
R2	B	0.124	0.035		CHA
R2		(0.155)	(0.054)	(0.029)	FER
R2		(0.117)	(0.028)		ALT
R2	A	THE STATISTICAL AND SYSTEMATIC ER			
R2	B	THE STATISTICAL AND SYSTEMATIC ER			
R2					
R2		THE AVERAGE OF THE THREE HIGH-ENE			
R2		THESE EXPERIMENTS PRODUCE OTHER B			
R2		THE B MESON.			
R3	B INTO (E+ E- ANYTHING)/TOTAL				
R3		(0.05) OR LESS	CL=.90		BEB
R4	B INTO (MU+ MU- ANYTHING)/TOTAL				
R4		(0.017)OR LESS	CL=.90		CHA
R4		0.007 OR LESS	CL=.95		ADE
R4		0.007 OR LESS	CL=.95		BAR
R4		(0.02) OR LESS	CL=.95		ALT
R5	B INTO (DILEPTON ANYTHING)				

B Meson Section 2014

Section is 198 pages.

In 2008 was 144 pages

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

$B_c^+ = c\overline{b}$, $B_c^- = \overline{c}b$, similarly for B_c^{*}'s

$B_c^\pm$

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

$B_c^\pm$ MASS

VALUE (GeV)			DOCUMENT ID		TECN	COMMENT
6.2756 ±0.0011 OUR AVERAGE						
6.27628	±0.00144	±0.00036	[1] AAIJ	13AS	LHCB	pp at 7, 8 TeV
6.2737	±0.0013	±0.0016	[2] AAIJ	12AV	LHCB	pp at 7 TeV
6.2756	±0.0029	±0.0025	[3] AALTONEN	08M	CDF	$p\overline{p}$ at 1.96 TeV
6.300	±0.014	±0.005	[3] ABAZOV	08T	D0	$p\overline{p}$ at 1.96 TeV
6.4	±0.39	±0.13	[4] ABE	98M	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
6.2857	±0.0053	±0.0012	[3] ABULENCIA	06C	CDF	Repl. by AALTONEN 08M
6.32	±0.06		[5] ACKERSTAFF	98O	OPAL	$e^+e^- \to Z$

[1] AAIJ 13AS uses the $B_c^+ \to J/\psi D_s^+$.
[2] AAIJ 12AV uses the $B_c^+ \to J/\psi\pi^+$ mode and also measures the mass difference $M(B_c^+) - M(B^+) = 994.6 \pm 1.3 \pm 0.6$ MeV/c^2.
[3] Measured using a fully reconstructed decay mode of $B_c \to J/\psi\pi$.
[4] ABE 98M observed $20.4^{+6.2}_{-5.5}$ events in the $B_c^+ \to J/\psi(1s)\ell\nu_\ell$ with a significance of > 4.8 standard deviations. The mass value is estimated from $m(J/\psi(1S)\ell)$.
[5] ACKERSTAFF 98O observed 2 candidate events in the $B_c^+ \to J/\psi(1S)\pi^+$ channel with an estimated background of 0.63 ± 0.20 events.

$B_c^\pm$ MEAN LIFE

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
0.452±0.033 OUR EVALUATION				
0.500±0.013 OUR AVERAGE				
0.509 ±0.008 ±0.012	[6] AAIJ	14G	LHCB	pp at 8 TeV
	[7] AALTONEN	13	CDF	$p\overline{p}$ at 1.96 TeV

Γ_{11}	$D^+ K^{*0}$	< 0.20
Γ_{12}	$D^+ \overline{K}^{*0}$	< 0.16
Γ_{13}	$D_s^+ K^{*0}$	< 0.28
Γ_{14}	$D_s^+ \overline{K}^{*0}$	< 0.4
Γ_{15}	$D_s^+ \phi$	< 0.32
Γ_{16}	$K^+ K^0$	< 4.6
Γ_{17}	$B_s^0\pi^+ / B(\overline{b} \to B_s)$	$(2.37^{+0.}_{-0.}$

B_c^+ BRANCHING RATIOS

$\Gamma(J/\psi(1S)\ell^+\nu_\ell \text{anything})/\Gamma_{\text{total}} \times B(\overline{b} \to B_c)$

VALUE	CL%	DOCUMENT ID		TECN
$(5.2^{+2.4}_{-2.1}) \times 10^{-5}$		[9] ABE	98M	CDF
• • • We do not use the following data for averages, fits, limits				
$< 1.6 \times 10^{-4}$	90	[10] ACKERSTAFF	98O	OPAL
$< 1.9 \times 10^{-4}$	90	[11] ABREU	97E	DLPH
$< 1.2 \times 10^{-4}$	90	[12] BARATE	97H	ALEP

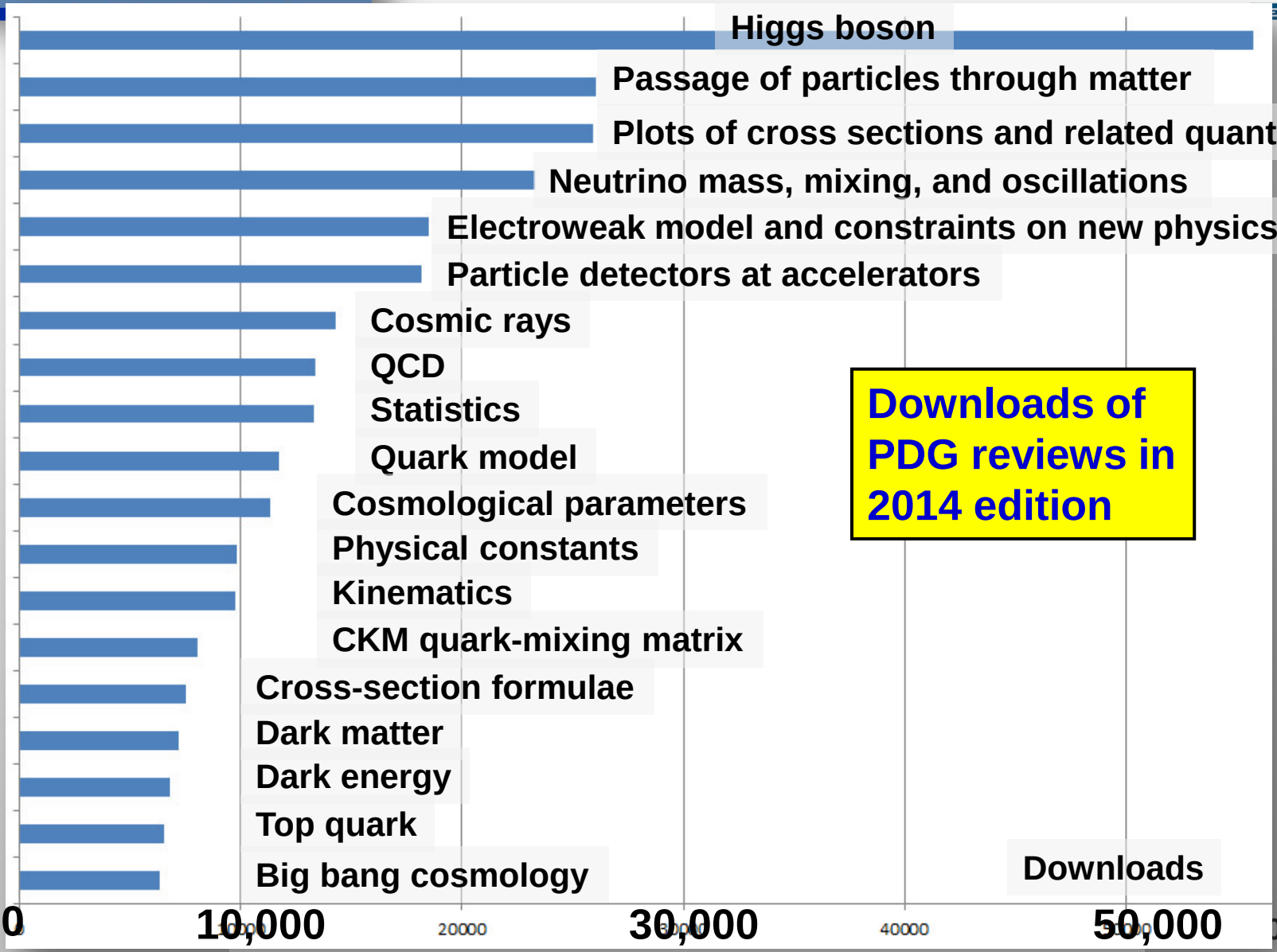
[9] ABE 98M result is derived from the measurement of $[\sigma(B_c)\times$ $[\sigma(B^+)\times B(B^+ \to J/\psi(1S)K^+)] = 0.132^{+0.041}_{-0.037}(\text{stat})\pm$ by using PDG 98 values of $B(b \to B^+)$ and $B(B^+ \to J/$
[10] ACKERSTAFF 98O reports $B(Z \to B_c X)/B(Z \to q\overline{q})\times$ 6.95×10^{-5} at 90%CL. We rescale to our PDG 98 values o
[11] ABREU 97E value listed is for an assumed $\tau_{B_c} = 0.4$ ps and $\tau_{B_c} = 1.4$ ps.
[12] BARATE 97H reports $B(Z \to B_c X)/B(Z \to q\overline{q})\cdot B(B_c \to$ at 90%CL. We rescale to our PDG 96 values of $B(Z \to b\overline{b})$. candidate event is found, compared to all the known back which gives $m_{B_c} = 5.96^{+0.25}_{-0.19}$ GeV and $\tau_{B_c} = 1.77 \pm 0.1$

$\Gamma(J/\psi(1S)\pi^+)/\Gamma_{\text{total}} \times B(\overline{b} \to B_c)$

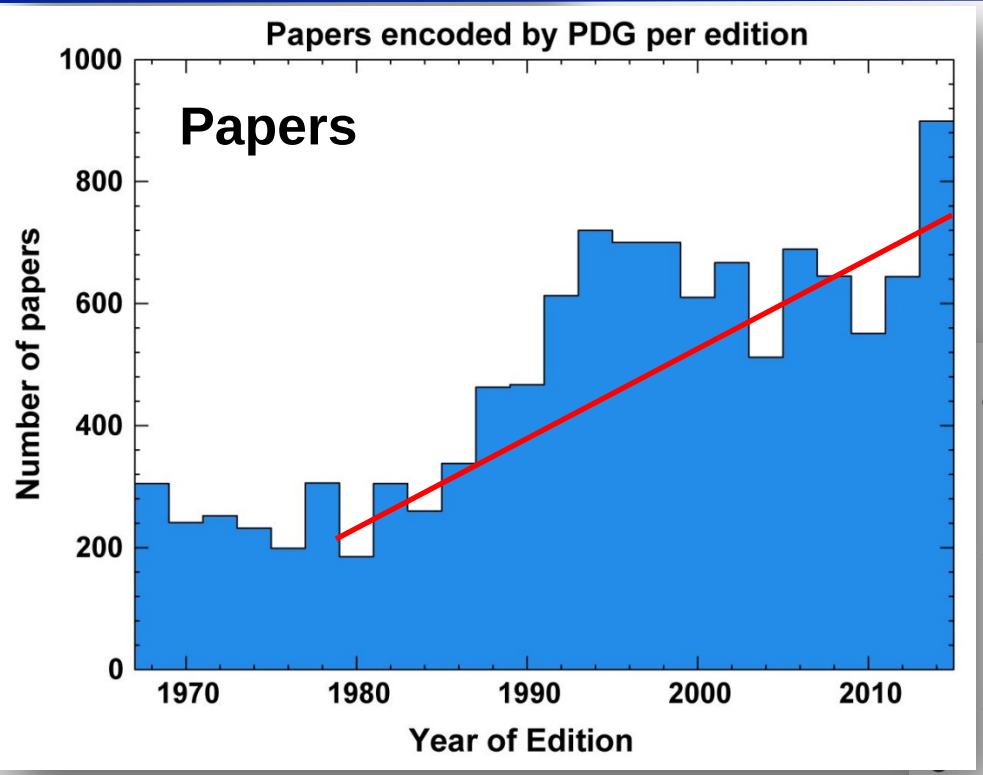
VALUE	CL%	DOCUMENT ID		TECN
seen		AALTONEN	13	CDF
seen		[13] AAIJ	12AV	LHCB
seen		AALTONEN	08M	CDF
seen		ABAZOV	08T	D0
• • • We do not use the following data for averages, fits, limits				
$< 2.4 \times 10^{-4}$	90	[14] ACKERSTAFF	98O	OPAL
$< 3.4 \times 10^{-4}$	90	[15] ABREU	97E	DLPH
$< 8.2 \times 10^{-5}$	90	[16] BARATE	97H	ALEP
$< 2.0 \times 10^{-5}$	95	[17] ABE	96R	CDF

[13] AAIJ 12AV reports a measurement of $B(B_c^+ \to J/\psi\pi^+)/B$ $(0.68 \pm 0.10 \pm 0.03 \pm 0.05)\%$ at $p_T(B) > 4$ GeV and 2.5
[14] ACKERSTAFF 98O reports $B(Z \to B_c X)/B(Z \to q\overline{q})\times$

Amazing Diversity of Topics Interest Our Community

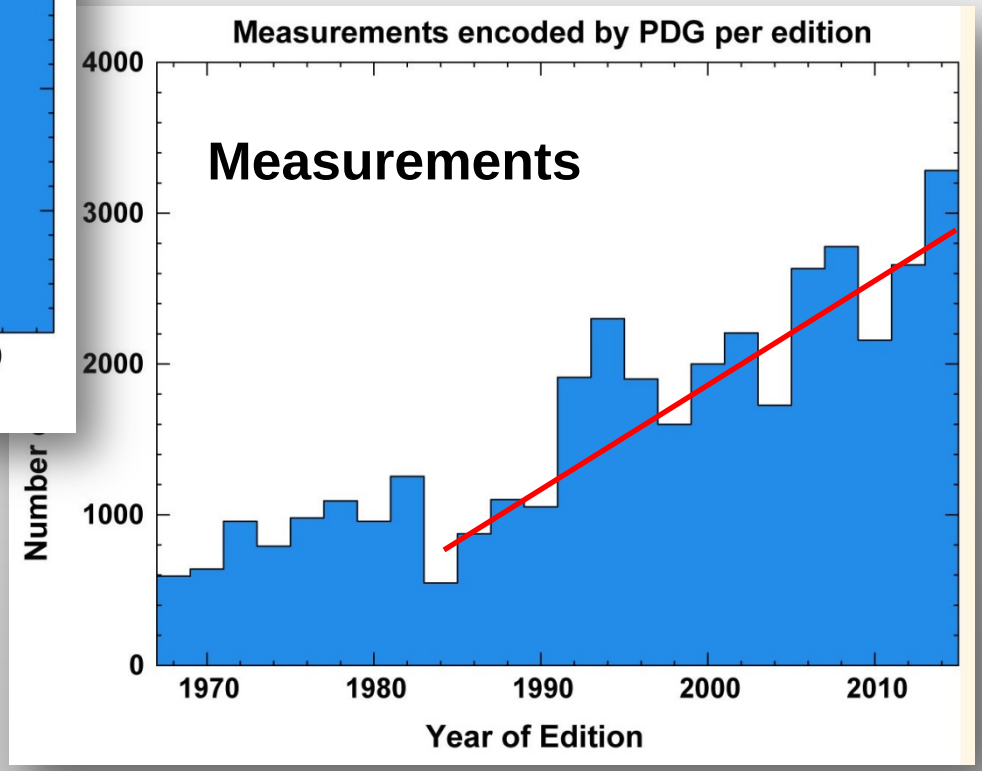


Workload Trends



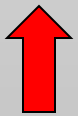
LHC bump

Some editions are more or less than 24 months, yielding fluctuations in graphs.



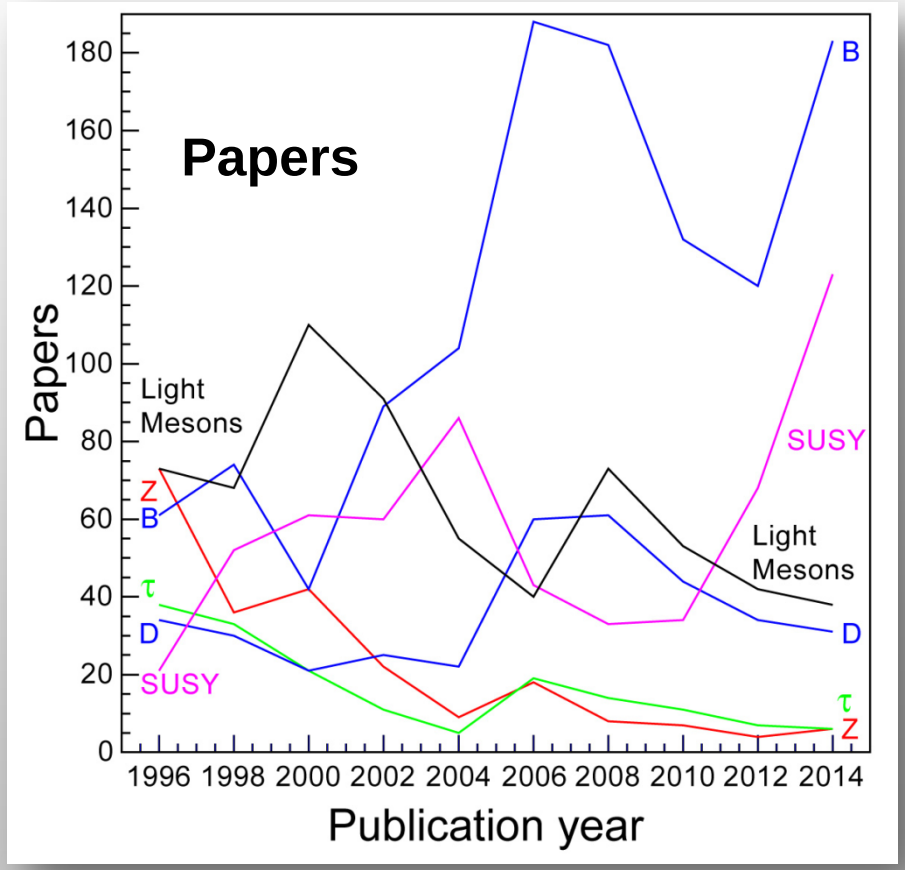
Searches

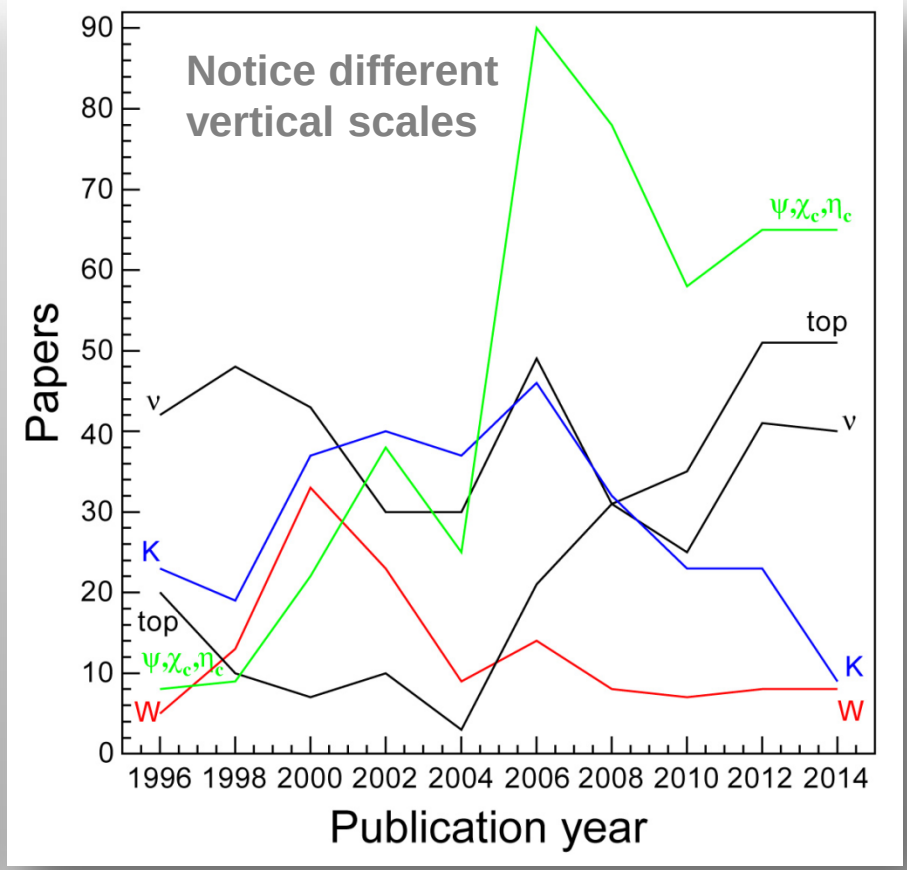
Papers	2008	2010	2012	2014
Supersymmetry	33	34	68	123
Axions	18	21	21	36
Higgs	12	34	51	138
W', Z'	18	16	36	50
Compositeness	6	5	12	17
Extra dimensions	11	10	17	32
Other searches	4	12	37	94
Free q, monopoles	1	3	2	6
	103	135	244	496



Trends in coverage

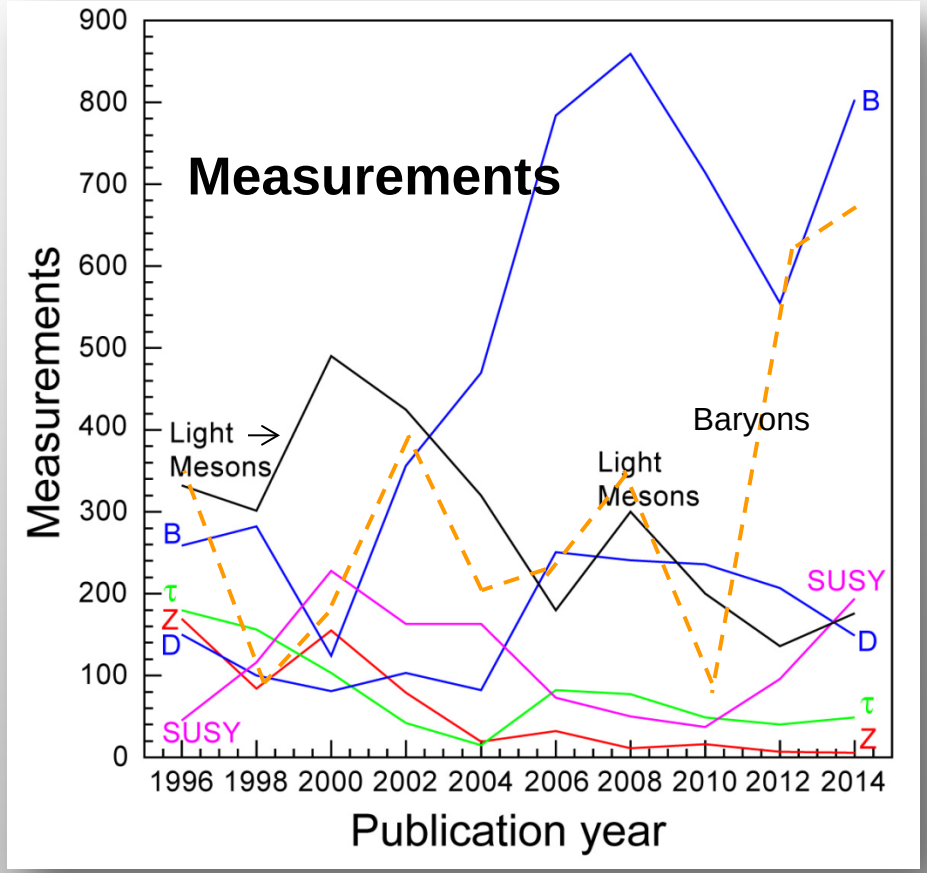
132/120/183 B papers in 2010/2012/2014 editions

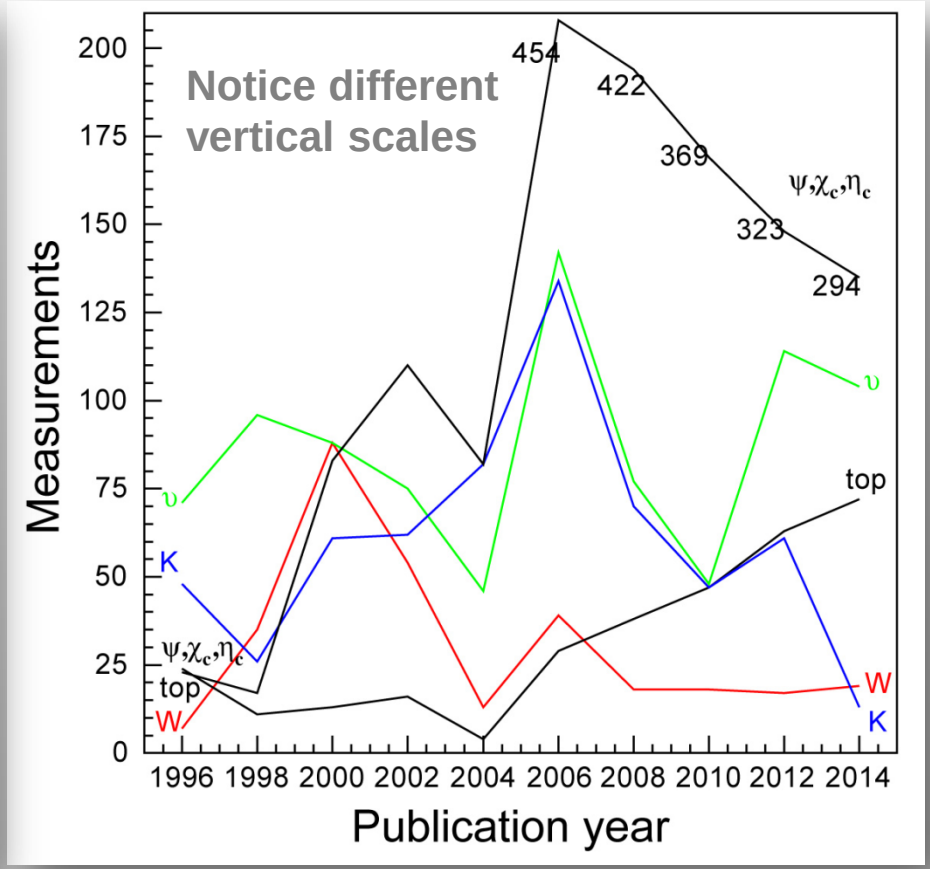




Trends in coverage

714/555/803 B measurements in 2010/2012/2014 editions





New Papers in RPP-2014

Papers	2010	2012	2014
W Boson	7	8	8
Z Boson	7	4	6
τ Lepton	11	7	6
Neutrinos and mixing	25	41	40
Quarks (u,d,c,s,b)	17	20	24
Top quark	35	51	51
b', t' quarks	1	5	15
γ, e, μ, π, η	20	15	11
K mesons	23	23	9
D and D_s mesons	44	34	31
B and B_s mesons	132	120	183
ψ, η_c, χ_c, χ_b, upsilon	72	65	65
Other unstable mesons	58	106	103
Baryons	23	38	38
Supersymmetry	34	68	123
Axions	21	21	36
Higgs	34	51	138
W', Z'	16	36	50
Compositeness	5	12	17
Extra dimensions	10	17	32
Other searches	12	37	94
Free q, monopoles	3	2	6
TOTAL	553	644	899

Measurements	2008	2010	2014
W Boson	18	17	19
Z Boson	16	7	6
τ lepton	49	40	49
Neutrinos and mixing	48	114	104
Quarks (u,d,c,s,b)	33	51	27
Top quark	47	63	72
b', t' quarks	1	6	17
γ, e, μ, π, η	40	23	11
K mesons	47	61	13
D and D_s mesons	236	207	149
B and B_s mesons	714	555	803
ψ, η_c, χ_c, χ_b, upsilon	329	323	294
Other unstable mesons	369	568	470
Baryons	88	667	714
Supersymmetry	37	96	194
Axions	22	22	40
Higgs	45	68	258
W', Z'	29	60	66
Compositeness	5	13	23
Extra dimensions	14	19	42
Other searches	22	65	279
Free q, monopoles	4	2	7
TOTAL	2167	2658	3236

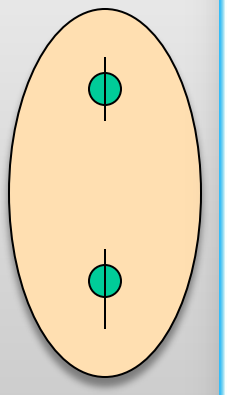
Impact

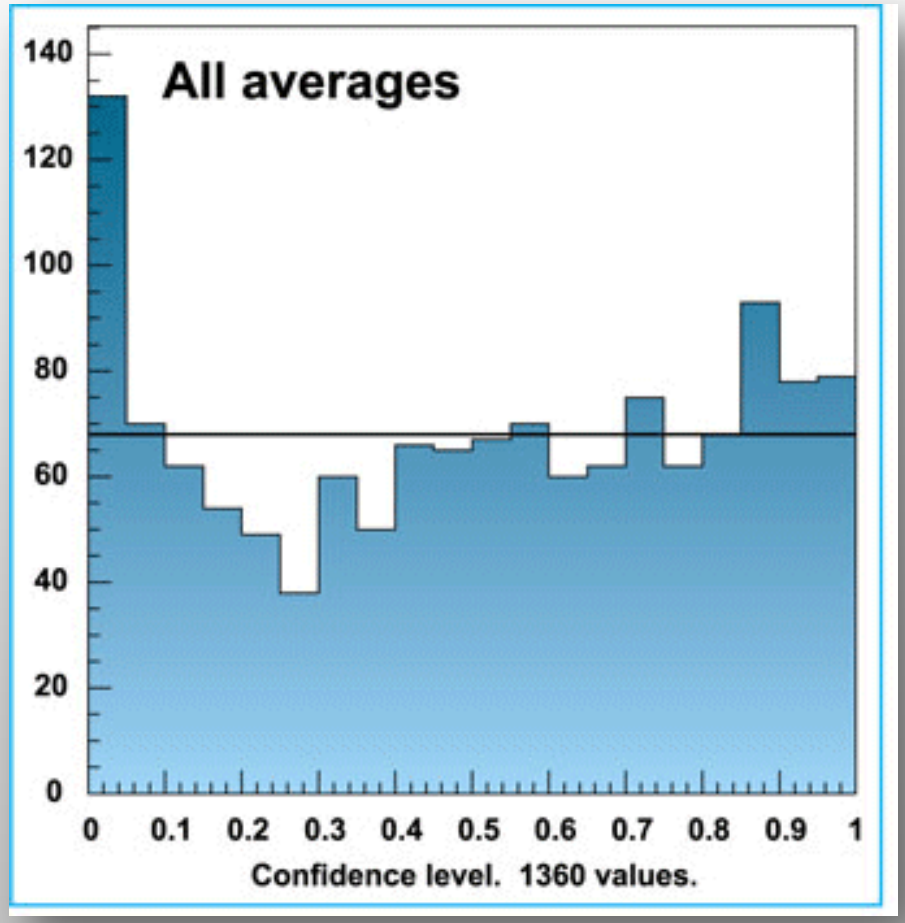
- 32,000 Booklets requested
- 14,000 RPP books requested
- 10 million hits/year on website (>180 countries)
- 51,000 citations of RPP
- Most cited publication in HEP

Confidence Levels of Averages

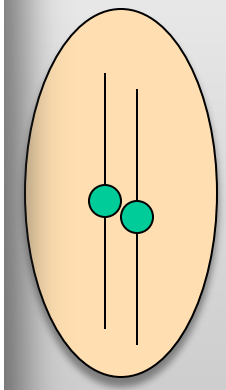
Each point is one average.

Peak at left due to conflicting measurements.





Broad peak at right due to conservative error bars.



PDG Authors at LBNL

Research involvement has always been a keystone to the success (and quality) of PDG work.

LBNL Physicists (ATLAS, Daya Bay, Theory):

Juerg Beringer
Dan Dywer
Cheng-Ju Lin
Simone Pagan Griso
Weiming Yao
Michael Barnett

Editor Physicist

Piotr Zyla

Central Leadership

PDG leadership group at LBNL coordinates the entire effort

- Produces and publishes the Review,
- Handles all of the final checking, editing,
- Major contributor to the content,
- Chooses the authors and the content,
- Maintains the schedule
- Coordinates the input of 700 consultants from HEP community.

Essential for

- High-quality
- Timely publication

Except for the PDG staff at LBNL, all work for PDG is carried out by volunteers who spend only a few percent of their time on PDG work

Publishing

Five publishers bid on RPP and Booklet in past:

Physics Letters B (Elsevier)

Physical Review D (AIP)

Journal of Physics G (IoP)

European Physical Journal C (Springer)

Chinese Physics C (Chinese Phys. Soc.)

This year, one publisher bid on RPP and Booklet

Budget

Funding from DOE + Japan (Japan 6% in FY15)

NSF grant (12% of budget) ended last year.

Due to Congress' continuing resolution, the PDG budget for this year (FY15) has been cut by 11%.

96% of the PDG budget is salary.
In FY15, salary alone is more than our funding during CR.

- **We no longer pay any portion of retiree contributions.**
- **We replaced our full-time admin with a 10% admin**
  (trying to hire a 1 FTE programmer to replace CD help)
- **All printed products are not currently in our budget.**

This situation is not sustainable.

Vital roles of
CERN, Japan, INSPIRE

CERN

50+ year collaboration

Administration for CERN funding (Michael Doser).

Pays publisher directly for their copies.

Oversees support for the Meson Team (space, travel), which is mostly non-CERN people who meet at CERN.

Mirror website maintained.

14 (of 206) CERN members (as individuals):
Doser, Basaglia, Ceccucci, Gurtu, Hoecker, Holtkamp, Kado, Moortgat, Roesler, Salam, Sauli, Silari, Skands, and Zimmerman.

An Essential Collaboration

28 Years of Japan-US Collaboration

- The PDG Japan-US Collaboration is a very successful and essential effort.
- The quality of the Review of Particle Physics is very much enhanced by the participation of Japanese physicists.
- 4400 products mailed to Japanese physicists (which they pay for)
- Mirror website maintained.
- In charge of major sections.
- Administration for Japanese funding (Ken-ichi Hikasa); oversees support for Japanese members (travel).

Japan

Reviews and Data Sections

- Neutrinos
- CKM Quark Mixing
- Top quark
- Higgs bosons
- Supersymmetry
- Compositeness of quarks and leptons
- Axions
- Heavy bosons (W', Z', etc.)
- Even more exotic particles.

Japan

Leadership (past and present)

- Dr. Kasuke Takahashi
- Prof. Yoshio Oyanagi
- Prof. Ken-ichi Hikasa (current leader)

Eleven Japanese physicists

- Dr. Kaoru Hagiwara (KEK)
- Dr. Shoji Hashimoto (KEK)
- Prof. Yoshinari Hayato (Tokyo University)
- Prof. Ken-ichi Hikasa (Tohoku University)
- Prof. Hitoshi Murayama (WPI Tokyo)
- Dr. Kenzo Nakamura (KEK)
- Dr. Yoshihide Sakai (KEK)
- Prof. Takayuki Sumiyoshi (Tokyo Metropolitan U.)
- Prof. Fuminobu Takahashi (Tohoku University)
- Prof. Masaharu Tanabashi (Nagoya University)
- Dr. Akira Yamamoto (KEK)

INSPIRE Collaboration

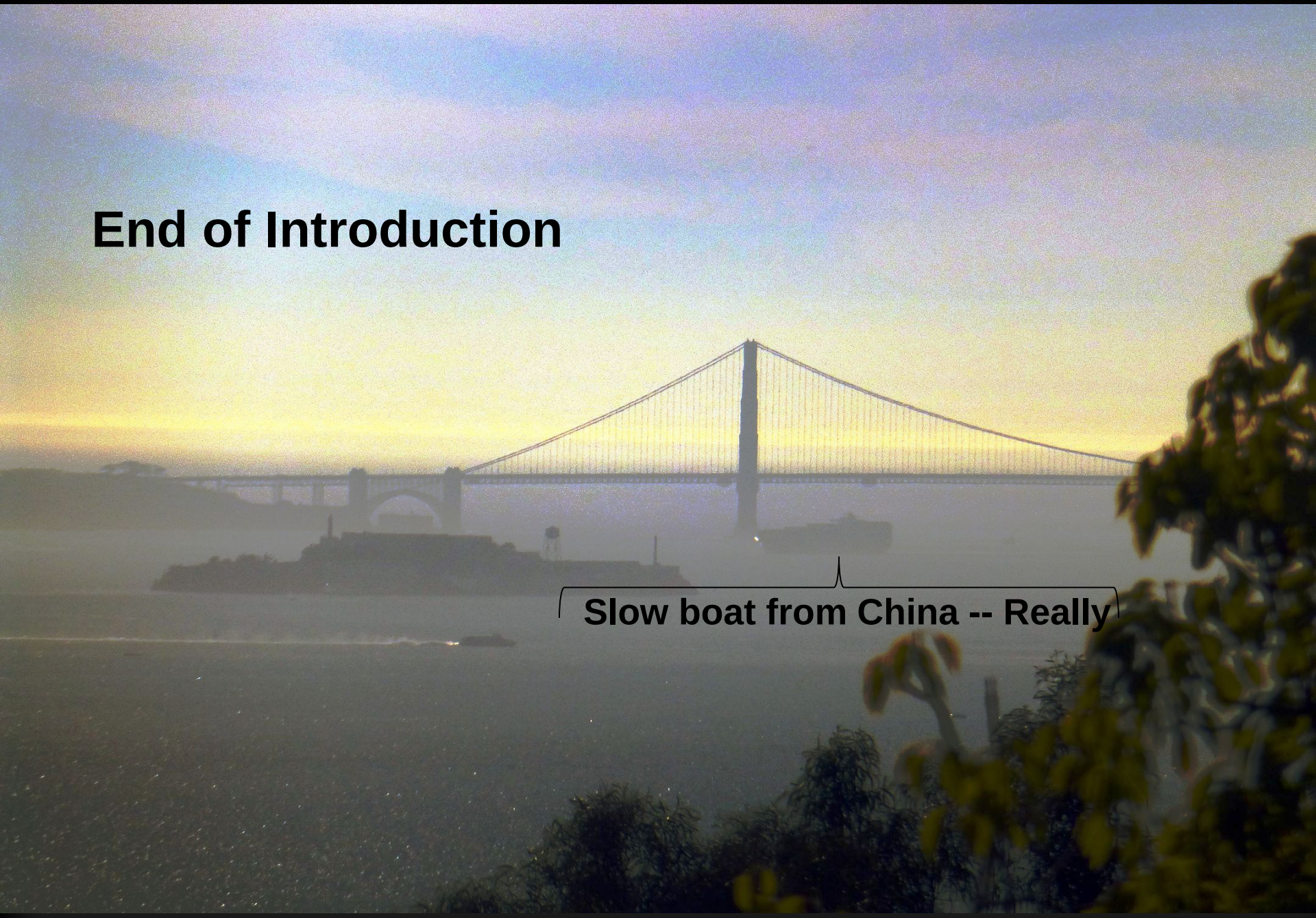
Many years collaboration (> 20)

Coordination with SLAC Library group.
SPIRES → Now INSPIRE (and CERN)

Yields our ability to link to the papers from which the measurements come.

Many discussions of improved coverage for the HEP community.

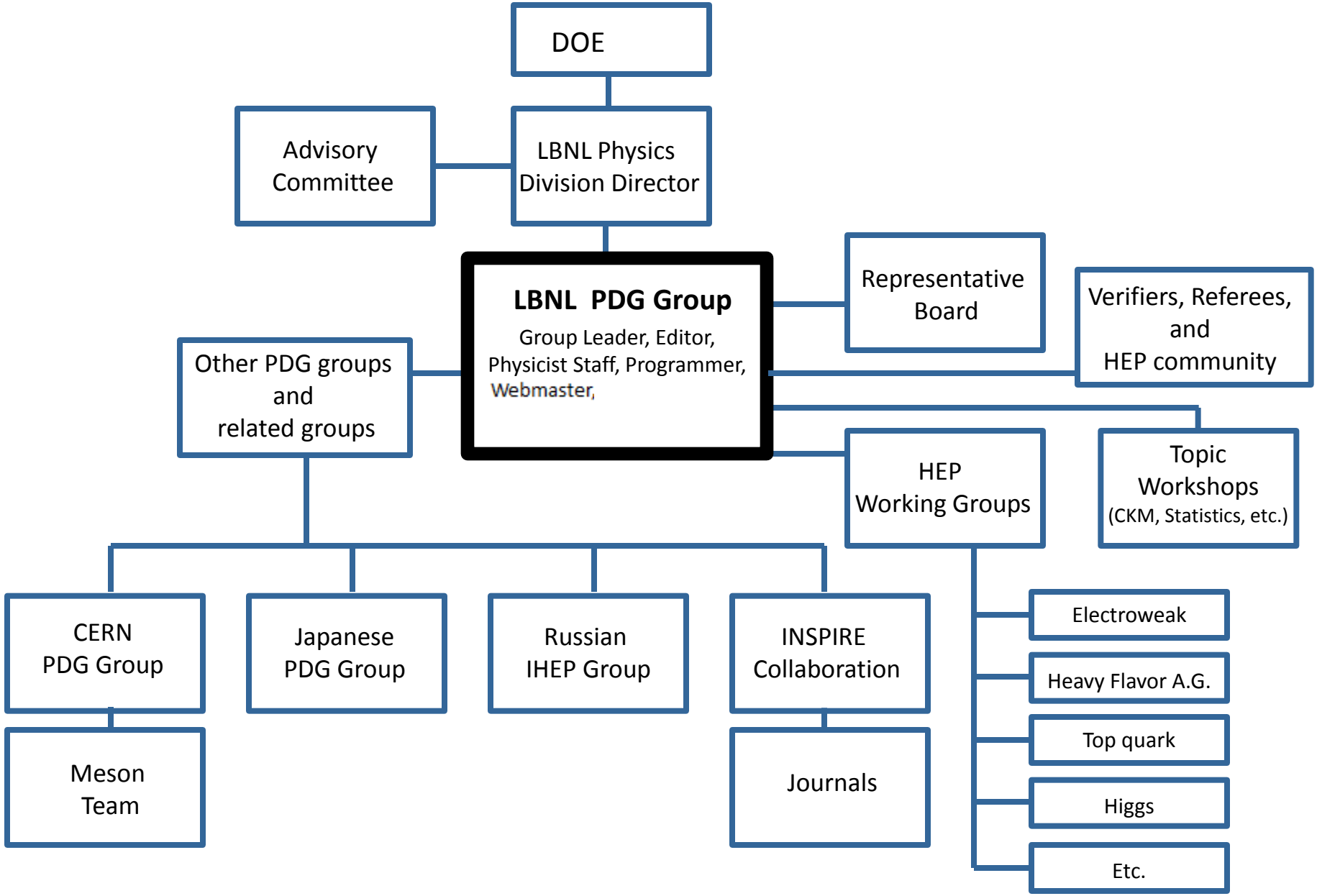
End of Introduction

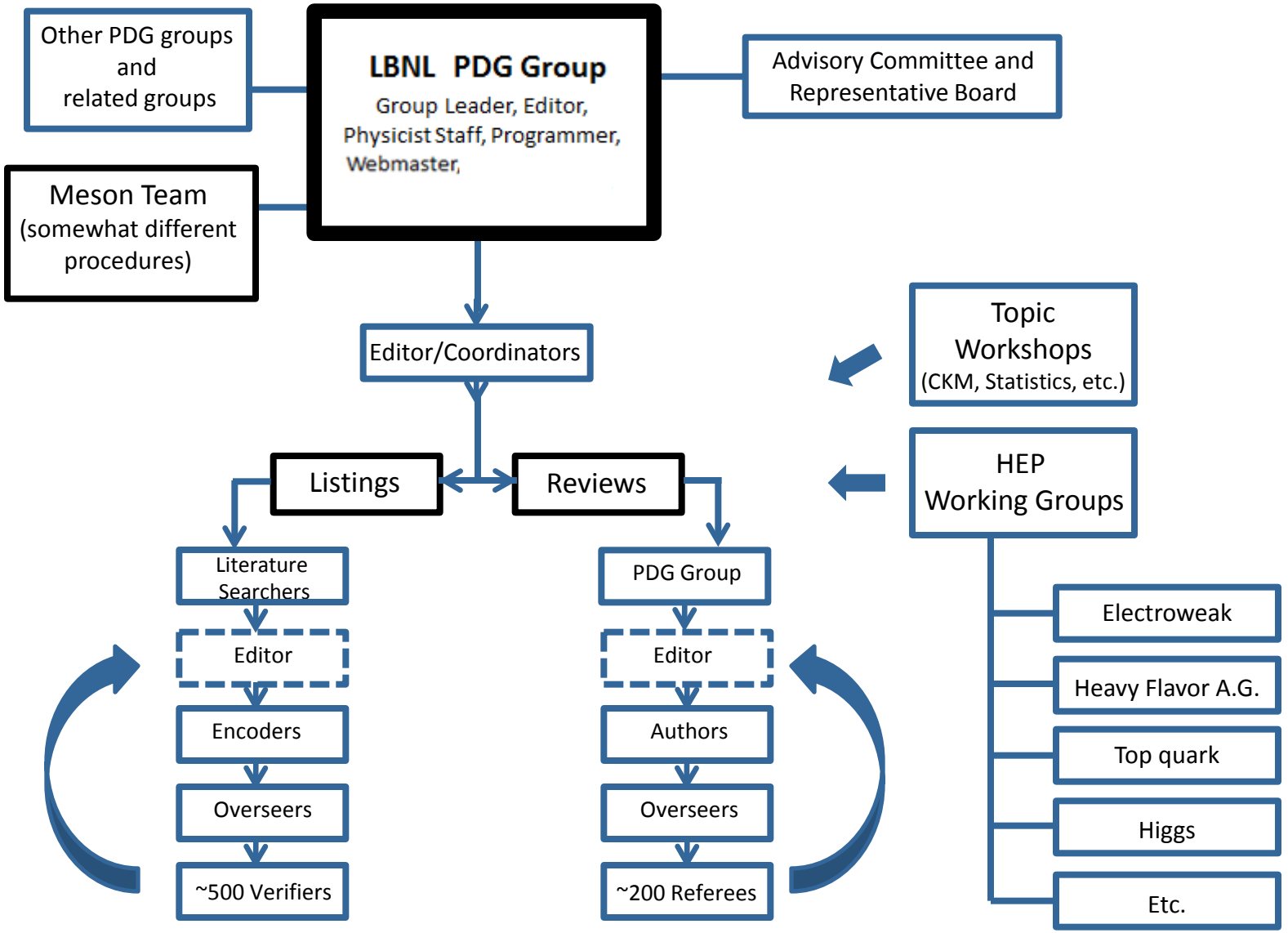


Procedures

The process of producing the

Review of Particle Physics


DOE
Advisory Committee
LBNL Physics Division Director
LBNL PDG Group
Group Leader, Editor, Physicist Staff, Programmer, Webmaster,
Representative Board
Verifiers, Referees, and HEP community
Other PDG groups and related groups
HEP Working Groups
Topic Workshops (CKM, Statistics, etc.)
CERN PDG Group
Japanese PDG Group
Russian IHEP Group
INSPIRE Collaboration
Meson Team
Journals
Electroweak
Heavy Flavor A.G.
Top quark
Higgs
Etc.


Other PDG groups and related groups
LBNL PDG Group
Group Leader, Editor, Physicist Staff, Programmer, Webmaster,
Advisory Committee and Representative Board
Meson Team (somewhat different procedures)
Editor/Coordinators
Topic Workshops (CKM, Statistics, etc.)
HEP Working Groups
Listings
Reviews
Literature Searchers
Editor
Encoders
Overseers
~500 Verifiers
PDG Group
Editor
Authors
Overseers
~200 Referees
Electroweak
Heavy Flavor A.G.
Top quark
Higgs
Etc.

Literature Search

Complete Literature Search by two people of 20 journals (600 papers per edition predominantly from PL, PRL, PR, JHEP, and EPJ)

Enter Literature search results in database

Distribute assignments of papers to Encoders and Overseers

Procedures

Encoding

Each paper read carefully by two people: by encoder and by overseer

Encoder and Overseer initiate data entry

Encoding data entered into database:
Sections have very different formats

Create new sections, delete sections, reorganize/combine sections

Procedures

Reviews

Write/edit Reviews describing content of and/or problems in a given section

Referee each review and note (3-5 referees)

Place reviews into system so can produce book and web versions

Procedures

Final processing

Edit all sections for consistency, errata, quality, etc.

Request Verification of every entry from each experiment

Enter corrections/changes from Verifications

Calculate Averages, Fits and Best Limits.
Many of these are unique by section

Prepare Summary Table

Prepare Conservation Laws table (with impact on Listings and Summary Table)

Procedures

Production

Post Listings and Reviews on web

Produce 1675-page book of Summary Tables, Listings, Reviews

Produce web versions of everything in book Including pdgLive

Produce 328-page Booklet with Summary Tables and abridged version of reviews

Quality Assurance

The HEP Community and many others depend on us for accuracy and integrity

Quality Assurance

- All reviews have 3-5 referees.
- Every item of data that is entered is checked by the experiments (700 people help).
- PDG Advisory Committee reviews all PDG operations

We strive to only report what is a fair consensus of the community.
E.g.- For the growing B sections, the three encoders are from Belle, LHCb, and Tevatron.

We invite comments from the collaborations on many sections.

We organize mini-workshops when we need to consider expanded and improved coverage of a section (such as D mesons, B mesons, neutrinos, tau leptons, CKM, extra dimensions, ...)

PDG Advisory Committee

Deborah Harris – Chair	**(Fermilab)**
James Olsen	**(Princeton)**
Junichi Tanaka	**(U. of Tokyo)**
Tancredi Carli	**(CERN)**
Anze Slosar	**(BNL)**
Yasunori Nomura	**(UC Berkeley)**

Distinguished Members of Past Advisory Committees

Peter Zerwas

Taka Kondo

Michael Turner

Michel della Negra

Jonathan Dorfan

Ann Kernan

Lincoln Wolfenstein

Gary Feldman

Rudiger Voss

Hiroaki Aihara

Persis Drell

Dieter Schlatter

Paul Langacker

Mark Wise

Stephen Ellis

Chris Quigg

Mike Whalley

Jonathan Rosner

Fred Gilman

Gustaaf Brooijamns

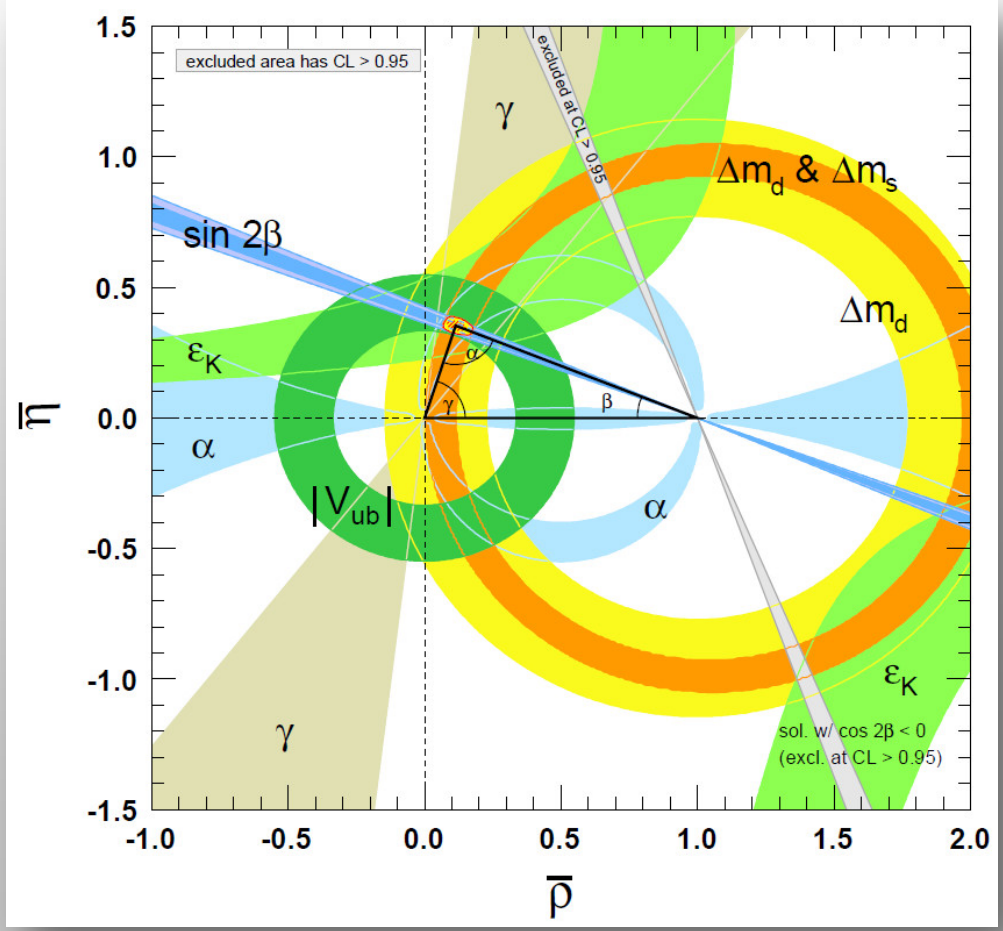
Patrick Janot

Gilad Perez

Vital PDG Workshops

Workshops lead to improved coverage

- Searches
- Neutrino
- CKM
- D Meson
- τ lepton
- Extra-dimensions
- Statistics



Collaboration with Working Groups

Coordination with working groups at

LHC, Tevatron, B-factories, LEP on:

- **Higgs**
- **Electroweak fits,**
- **B lifetimes, B mixing,**
- **V_{cb} and V_{ub}**
- **top quark mass, etc.**

PDG role in CKM workshops, Statistics workshops, etc.

TWiki > LHCPhysics Web > HiggsCombination (06 Aug 2014, EilamGross)

Edit Attach Pl

LHC Higgs Combination Group (LHC-HCG)

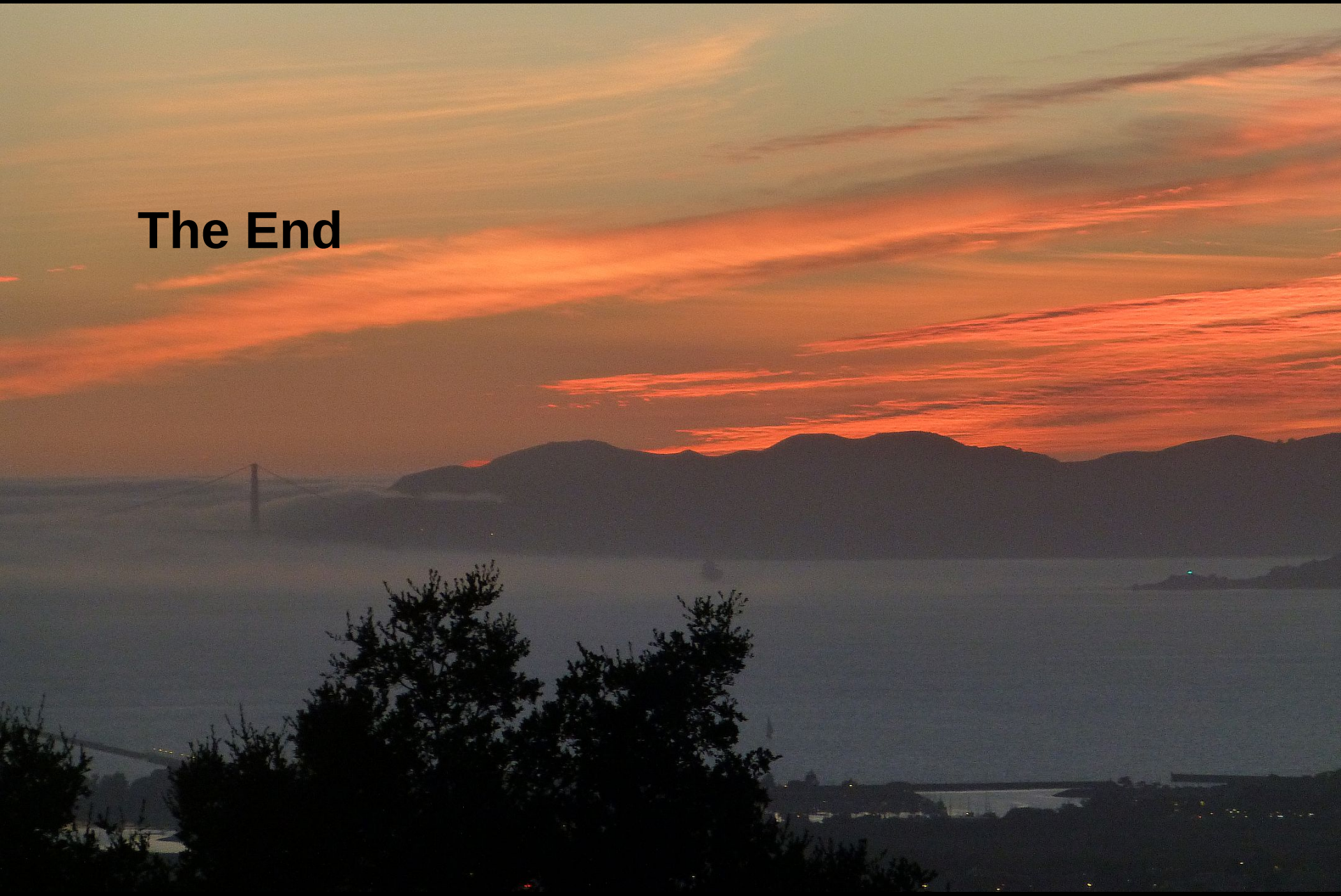
Charge

The working group has been charged to produce a combined Higgs result from LHC (ATLAS and CMS) Higgs analyses.

Composition

role	ATLAS	CMS
Conveners & Contact	Eilam Gross	Marco Pieri
Higgs X-section representatives	Reisaburo Tanaka (LAL)	Chiara Mariotti (Torino)

Other members are: ATLAS and CMS spokespeople and physics coordinators and participating experts as and when needed.


The End