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Template for LHCb Analysis notes

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Abstract

Guidelines for the preparation of LHCb publications are given. This is a "living" document, that should reflect our current practice. Please contact the Editorial Board chair if you have suggestions for any additions (or if you disagree strongly with any of the current recommendations).

1 Introduction

This is the template for typesetting LHCb notes and journal papers. It should be used for any document in LHCb [1] that is to be publicly available. The format should be used for uploading to preprint servers and only afterwards should specific typesetting required for journals or conference proceedings be applied. The main LaTeX file contains several options as described in the LaTeX comment lines.

This template also contain the guidelines for how publications and conference reports should be written. Through the symbols defined in `lhcb-symbols-def.tex` it should be easy to follow the majority of requirements set out here.

2 General principles

The main goal is for a paper to be clear. It should be as brief as possible, without sacrificing clarity. For all public documents, special consideration should be given to the fact that the reader will be less familiar with LHCb thatn the author.

Here follow a list of general principles that should be adhered to:

1. Choices that are made concerning layout and typography should be consistently applied throughout the document.

2. Standard English should be used (British rather than American) for LHCb notes and preprints. Examples: colour, flavour, centre, metre and aluminium. The punctuation normally follows the closing quote mark of quoted text, rather than being included before the closing quote. When in doubt, consult a dictionary. Papers which are to be submitted to an American journal can be written in American English instead. Under no circumstance should the two be mixed.

3. Use of jargon should be avoided where possible. "PID" is "particle identification", "Systematics" are "systematic uncertainties", etc. Data are plural.

4. LaTeX should be used for typesetting. Line numbering should be switched on for drafts that are circulated for comments.

5. The authorship for Conference Reports should be "The LHCb Collaboration", with a footnote giving the name(s) of the contact author(s), but without the full list of collaboration names. For journal publications the full author list should be included. It is provided by the Membership Committee and will contain the authors eligible on the date of the first circulation of the paper to the collaboration.

6. The abstract should be concise, and not include citations or numbered equations, and should give the key results from the paper.

7. Text in the document should not be cut-and-pasted from other sources that have previously been published. This also applies to the description of the detector and trigger in papers.

8. References should usually be made only to publicly accessible documents. References to LHCb conference reports and public notes should be avoided in journal publications, instead including the relevant material in the paper itself.

9. The use of tenses should be consistent. It is recommended to mainly stay in the present tense, for the abstract, the description of the analysis, etc; the past tense is then used where necessary, for example when describing the data taking conditions.

10. It is recommended to use the passive rather than active voice: "the mass was measured", rather than "we measured the mass". Limited use of the active voice is acceptable, in situations where re-writing in the passive form would be cumbersome, such as for the acknowledgments. Some leeway is permitted to accommodate different author's styles, but "we" should not appear excessively, in the abstract or the first lines of introduction or conclusion.

3 Layout

1. Unnecessary blank space should be avoided, between paragraphs or around figures and tables.

2. Figure and table captions should use a somewhat smaller typeface than the main text, to help distinguish them, and should be concise. Figure captions go below the figure, table captions go above the table.

3. Captions and footnotes should be punctuated correctly, like normal text. The use of too many footnotes should be avoided: typically they are used for giving commercial details of companies, or standard items like coordinate system definition or the implicit inclusion of charge-conjugate states.[1] In papers submitted to APS journals, *e.g.* PRL, PRD, fotnootes should be completely avoided as they are mixed together with the references.

4. Tables should be formatted in a simple fashion, without excessive use of horizontal and vertical lines. See Table 1 for an example.

5. Figures and tables should normally be placed so that they appear on the same page as their first reference, but at the top or bottom of the page; if this is not possible, they should come as soon as possible afterwards. They must all be referred to from the text.

6. Equations should be numbered using parentheses as shown in Eq. 1,

$$V_{us}V_{ub}^{*} + V_{cs}V_{cb}^{*} + V_{ts}V_{tb}^{*} = 0 \ . \tag{1}$$

[1]If placed at the end of a sentence, the footnote symbol normally follows the punctuation; if placed in the middle of an equation, take care to avoid any possible confusion with an index.

Table 1: Background-to-signal ratio estimated in a $\pm 50\,\mathrm{MeV}/c^2$ mass window for the prompt and long-lived backgrounds, and the minimum bias rate.

Channel	$B_{\rm pr}/S$	$B_{\rm LL}/S$	MB rate
$B_s^0 \to J/\psi\,\phi$	1.6 ± 0.6	0.51 ± 0.08	~ 0.3 Hz
$B^0 \to J/\psi\,K^{*0}$	5.2 ± 0.3	1.53 ± 0.08	~ 8.1 Hz
$B^+ \to J/\psi\,K^{*+}$	1.6 ± 0.2	0.29 ± 0.06	~ 1.4 Hz

7. Displayed results like

$$\mathcal{B}(B_s^0 \to \mu^+\mu^-) < 1.5 \times 10^{-8} \text{at } 95\% \text{ CL}$$

   should in general not be numbered.

8. Numbered equations should be avoided in captions and footnotes.

9. Displayed equations are part of the normal grammar of the text. This means that there should not be a colon before the equation, and the equation should end in full stop or comma if required when reading aloud. The line after the equation should only be indented if it starts a new section.

10. Sub-sectioning should not be excessive: sections with more than three levels of index (1.1.1) should be avoided.

11. It is generally preferable to itemize a list using numbers rather than bullets.

12. Abbreviations should be defined the first time they are used, e.g. "Monte Carlo (MC) events containing a doubly Cabibbo-suppressed (DCS) decay have been generated." Try to avoid excessive use of abbreviations. The definition of the abbreviation should always be on the same line as the last word of what it abbreviates.

4 Typography

The use of the LaTeX typesetting symbols defined in the file `lhcb-symbols-def.tex` and detailed in the appendices of this document is strongly encouraged as it will make it much easier to follow the recommendation set out below.

1. LHCb is typeset with a normal (roman) lowercase b.

2. Titles are in bold face, and usually only the first word is capitalized.

3. Mathematical symbols and particle names should also be typeset in bold when appearing in titles.

4. Units are in roman type, except for constants such as c or h that are italic: GeV, GeV/c^2. The unit should be separated from the value with a space, and they should not be broken over two lines. It is recommended to keep the factors of c for masses and momenta, e.g. $m = 3.1\,\mathrm{GeV}/c^2$. However, if they are dropped this should be done consistently throughout, and a note should be added at the first instance to indicate that units are taken with $c = 1$.

5. Italic is preferred for particle names (although roman is acceptable, if applied consistently throughout). Particle Data Group conventions should generally be followed: B^0 (no need for a "d" subscript), $B^0_s \to J/\psi\,\phi$, $\overline{B}{}^0_s$, K^0_{S} (note the uppercase roman type "S").

6. Variables are usually italic: V is a voltage (variable), while 1 V is a volt (unit).

7. Subscripts are roman type when they refer to a word (such as T for transverse) and italic when they refer to a variable (such as t for time): p_{T}, Δm_s, t_{rec}.

8. Standard function names are in roman type: e.g. cos, sin and exp.

9. Figure, Section, Equation, Chapter and Reference should be abbreviated as Fig., Sect., Eq., Chap. and Ref. respectively, when they refer to a particular (numbered) item, except when they start a sentence. Table and Appendix are not abbreviated. The plural form of abbreviation keeps the point after the s, e.g. Figs. 1 and 2.

10. Common abbreviations derived from Latin such as "for example" (e.g.), "in other words" (i.e.), "and so forth" (etc.), "and others" (et al.), "versus" (vs.) can be used, with the typography shown; other more esoteric abbreviations should be avoided.

11. Units, material and particle names are usually lower case if spelled out, but often capitalized if abbreviated: amps (A), gauss (G), lead (Pb), silicon (Si), kaon (K), proton (p).

12. The prefix for 1000 (k, e.g. kV) should not be confused with that used in computing (K, which strictly speaking denotes 2^{10}, e.g. KB).

13. Counting numbers are usually written in words if they start a sentence, or if they have a value of ten or below in descriptive text (i.e. not including figure numbers such as "Fig. 4", or values followed by a unit such as "4 cm").

14. Numbers larger than 9999 have a comma (or a small space) between the multiples of thousand: e.g. 10,000 or 12,345,678. The decimal point is indicated with a point rather than a comma: e.g. 3.141.

15. Hyphenation should be used where necessary to avoid ambiguity, but not excessively. For example: "big-toothed fish", but "big white fish". Cross-section is hyphenated.

16. Minus signs should be in a proper font (-1), not just hyphens (-1); this applies to figure labels as well as the body of the text.

17. Inverted commas (around a title, for example) should be a matching set of left- and right-handed pairs: "Title". The use of these should be avoided where possible.

18. Single symbols are preferred for variables in equations, *e.g.* $\mathcal{B}$ rather than BF for a branching fraction.

19. Parentheses are not usually required around a value and its uncertainty, before the unit, unless there is possible ambiguity: so $\Delta m_s = 20 \pm 2\,\text{ps}^{-1}$ does not need parentheses, whereas $f_d = (40 \pm 4)\%$ does. The unit should not need to be repeated in expressions like $1.2 < E < 2.4\,\text{GeV}$.

20. The same number of decimal places should be given for all values in any one expression (e.g. $5.20 < m_B < 5.34\,\text{GeV}/c^2$).

21. Apostrophes are best avoided for abbreviations: if the abbreviated term is capitalized or otherwise easily identified then the plural can simply add an s, otherwise it is best to rephrase: e.g. HPDs, π^0s, pions, rather than HPD's, π^0's, πs.

5 Figures

A standard LHCb style file for use in production of figures in ROOT is in the ERASMUS package `RootTools/LHCbStyle` or directly in SVN at `svn+ssh://svn.cern.ch/reps/lhcb/Erasmus/trunk/RootTools/LHCbStyle`. It is not mandatory to use this style, but it makes it easier to follow the recommendations below.

In Fig. 1 is shown an example of how to include an eps or pdf figure with the `\includegraphics` command (eps figures will not work with `pdflatex`).

1. Figures should be legible at the size they will appear in the publication, with suitable line width. Their axes should be labelled, and have suitable units (e.g. avoid a mass plot with labels in MeV/c^2 if the region of interest covers a few GeV/c^2 and all the numbers then run together). Spurious background shading and boxes around text should be avoided.

2. Colour may be used in figures, but the distinction between differently coloured areas or lines should be clear also when the document is printed in black and white, for example by suitable use of shading or differently dashed lines. As a minimum, colours that print in clearly different shades of grey should be used, with a corresponding description: e.g. "red (dark) and yellow (light) shaded areas".

3. Figures with more than one part should have the parts labelled (a), (b) etc., with a corresponding description in the caption; alternatively they should be clearly referred to by their position, e.g. Fig. 1 (left).

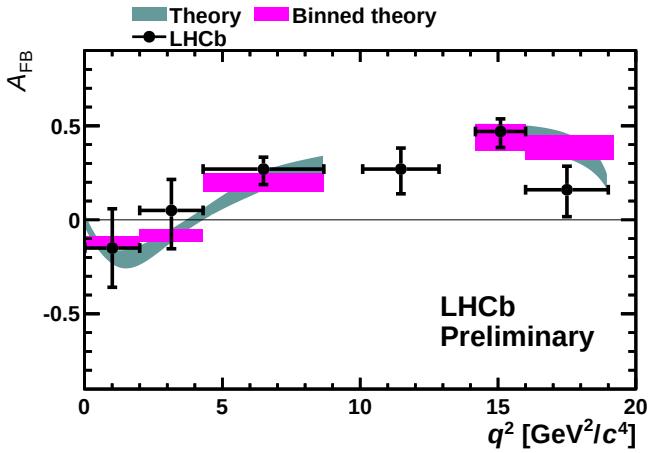

Figure 1: $A_{\rm FB}$ in $B^0 \to K^{*0}\mu^+\mu^-$ as a function of q^2. The theory predictions are from Ref. [2].

4. All figures containing LHCb data should have LHCb written on them, preferably in the upper right corner. For preliminary results, that should be replaced by "LHCb preliminary".

6 References

References should be made using BibTEX [3]. A special style `LHCb.bst` has been created to achieve a uniform style. Independent of the journal the paper is submitted to, the preprint should be created using this style. Where arXiv numbers exist, these should be added even for published articles. In the PDF file, hyperlinks will be created to both the arXiv and the published version.

1. Citations are marked using square brackets, and the corresponding references should be typeset using BibTEX and the official LHCb BibTEX style. An example is in Ref. [4].

2. For references with four or less authors all of the authors' names are listed [5], otherwise the first author is given, followed by *et al.*. the LHCb BibTEX style will take care of this.

3. The order of references should be sequential when reading the document.

4. The titles of papers should in general be included. To remove them, change `\setboolean{articletitles}{false}` to `true` at the top of this template.

5. The obtain the correct bibliographic information, the best option is to copy the BibTEX entry directly from `Spires` or `Inspire`. Some manual editing of the paper titles might be required to achieve correct LATEX formatting.

6. The `mciteplus` [6] package is used in order to enable multiple references to show up as a single item in the reference list. As an example `\cite{Aaij:2011rj,*Pascoli:2007qh}` where the `*` indicates that the reference should be merged with the previous one. The result of this can be seen in Ref. [7]. Be aware that the `mciteplus` package should be included as the very last item before the `\begin{document}` to work correctly.

Acknowledgments

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References

[1] LHCb, A. Alves et al., *The LHCb Detector at the LHC*, *JINST* **3** (2008) S08005.

[2] C. Bobeth, G. Hiller, and D. van Dyk, *More Benefits of Semileptonic Rare B Decays at Low Recoil: CP Violation*, `arXiv:1105.0376`.

[3] A. Feder, *Your BibTEX resource*, http://www.bibtex.org/.

[4] T. Sjostrand, S. Mrenna, and P. Z. Skands, *PYTHIA 6.4 Physics and Manual*, *JHEP* **0605** (2006) 026, [`arXiv:hep-ph/0603175`].

[5] E. Majorana, *Teoria simmetrica dell'elettrone e del positrone*, *Nuovo Cim.* **14** (1937) 171–184.

[6] M. Shell, *Mciteplus: Enhanced multicitations*, http://www.michaelshell.org/tex/mciteplus/.

[7] LHCb collaboration, R. Aaij et al., *Search for the rare decays $B_s^0 \to \mu^+\mu^-$ and $B^0 \to \mu^+\mu^-$*, *Phys. Lett.* **B699** (2011) 330–340, [`arXiv:1103.2465`]; S. Pascoli and S. Petcov, *Majorana Neutrinos, Neutrino Mass Spectrum and the $|\langle m \rangle| \sim 10^{-3}$ eV Frontier in Neutrinoless Double Beta Decay*, *Phys. Rev.* **D77** (2008) 113003, [`arXiv:0711.4993`].

Appendix

A Standard symbols

As explained in Sect. 4 this appendix contains standard typesetting of symbols, particle names, units etc. in LHCb documents.

In the file `lhcb-symbols-def.tex`, which is included, a very large number of symbols are defined. While they can lead to quicker typing, the main reason is to ensure a uniform notation within a document and indeed between different LHCb documents. If a symbol like `\CP` to typeset *CP* violation is available for a unit, particle name, process or whatever, it should be used. If you do not agree with the notation you should lobby to get the definition in `lhcb-symbols-def.tex` changed rather than just ignoring it.

All the main particles have been given symbols. The B mesons are thus named B^+, B^0, B_s^0, and B_c^+. There is no need to go into math mode to use particle names, thus saving the typing of many \$ signs. By default particle names are typeset in slanted type to agree with the PDG preference. To get roman particle names you can just change `\setboolean{uprightparticles}{false}` to `true` at the top of this template.

There is a large number of units typeset that ensures the correct use of fonts, capitals and spacing. As an example we have $m_{B_s^0} = 5366.3 \pm 0.6\,\mathrm{MeV}/c^2$. Note that `\mum` is typeset with an upright μ, even if the particle names have slanted greek letters.

A set of useful symbols are defined for working groups. More of these symbols can be included later. As an example in the Rare Decay group we have several different analyses looking for a measurement of $\mathcal{C}_7^{\prime(\mathrm{eff})}$ and $\mathcal{O}_{7.}^{\prime}$

B List of all symbols

B.1 Experiments

`\lhcb`	LHCb	`\ux85`	UX85	`\cern`	CERN
`\lhc`	LHC	`\atlas`	ATLAS	`\cms`	CMS
`\babar`	BABAR	`\belle`	BELLE	`\aleph`	ALEPH
`\delphi`	DELPHI	`\opal`	OPAL	`\lthree`	L3
`\lep`	LEP	`\cdf`	CDF	`\dzero`	D0
`\sld`	SLD	`\cleo`	CLEO	`\uaone`	UA1
`\uatwo`	UA2	`\tevatron`	TEVATRON		

B.1.1 LHCb sub-detectors and sub-systems

\pu	PU	\velo	VELO	\rich	RICH
\richone	RICH1	\richtwo	RICH2	\ttracker	TT
\intr	IT	\st	ST	\ot	OT
\Tone	T1	\Ttwo	T2	\Tthree	T3
\Mone	M1	\Mtwo	M2	\Mthree	M3
\Mfour	M4	\Mfive	M5	\ecal	ECAL
\spd	SPD	\presh	PS	\hcal	HCAL
\bcm	BCM	\ode	ODE	\daq	DAQ
\tfc	TFC	\ecs	ECS	\lone	L0
\hlt	HLT	\hltone	HLT1	\hlttwo	HLT2

B.2 Particles

B.2.1 Leptons

\electron	e	\en	e^-	\ep	e^+
\epm	$e^\pm$	\epem	e^+e^-	\ee	e^-e^-
\mmu	μ	\mup	μ^+	\mun	μ^-
\mumu	$\mu^+\mu^-$	\mtau	τ	\taup	τ^+
\taum	τ^-	\tautau	$\tau^+\tau^-$	\ellm	ℓ^-
\ellp	ℓ^+	\ellell	$\ell^+\ell^-$	\neu	ν
\neub	$\overline{\nu}$	\nuenueb	$\nu\overline{\nu}$	\neue	ν_e
\neueb	$\overline{\nu}_e$	\neueneueb	$\nu_e\overline{\nu}_e$	\neum	ν_μ
\neumb	$\overline{\nu}_\mu$	\neumneumb	$\nu_\mu\overline{\nu}_\mu$	\neut	ν_τ
\neutb	$\overline{\nu}_\tau$	\neutneutb	$\nu_\tau\overline{\nu}_\tau$	\neul	ν_ℓ
\neulb	$\overline{\nu}_\ell$	\neulneulb	$\nu_\ell\overline{\nu}_\ell$		

B.2.2 Gauge bosons and scalars

\g	γ	\H	H^0	\Hp	H^+
\Hm	H^-	\Hpm	$H^\pm$	\W	W
\Wp	W^+	\Wm	W^-	\Wpm	$W^\pm$
\Z	Z^0				

B.2.3 Quarks

\quark	q	\quarkbar	$\overline{q}$	\qqbar	$q\overline{q}$
\uquark	u	\uquarkbar	$\overline{u}$	\uubar	$u\overline{u}$
\dquark	d	\dquarkbar	$\overline{d}$	\ddbar	$d\overline{d}$
\squark	s	\squarkbar	$\overline{s}$	\ssbar	$s\overline{s}$
\cquark	c	\cquarkbar	$\overline{c}$	\ccbar	$c\overline{c}$
\bquark	b	\bquarkbar	$\overline{b}$	\bbbar	$b\overline{b}$
\tquark	t	\tquarkbar	$\overline{t}$	\ttbar	$t\overline{t}$

B.2.4 Light mesons

\pion	π	\piz	π^0	\pizs	$\pi^0{}_{\rm S}$
\ppz	$\pi^0\pi^0$	\pip	π^+	\pim	π^-
\pipi	$\pi^+\pi^-$	\pipm	$\pi^\pm$	\pimp	$\pi^\mp$
\kaon	K	\Kb	$\overline{K}$	\Kz	K^0
\Kzb	$\overline{K}^0$	\KzKzb	$K^0\overline{K}^0$	\Kp	K^+
\Km	K^-	\Kpm	$K^\pm$	\Kmp	$K^\mp$
\KpKm	K^+K^-	\KS	$K^0_{\rm S}$	\KL	$K^0_{\rm L}$
\Kstarz	K^{*0}	\Kstarzb	$\overline{K}^{*0}$	\Kstar	K^*
\Kstarb	$\overline{K}^*$	\Kstarp	K^{*+}	\Kstarm	K^{*-}
\Kstarpm	$K^{*\pm}$	\Kstarmp	$K^{*\mp}$	\etapr	η'

B.2.5 Heavy mesons

\D	D	\Db	$\overline{D}$	\Dz	D^0
\Dzb	$\overline{D}^0$	\DzDzb	$D^0\overline{D}^0$	\Dp	D^+
\Dm	D^-	\Dpm	$D^\pm$	\Dmp	$D^\mp$
\DpDm	D^+D^-	\Dstar	D^*	\Dstarb	$\overline{D}^*$
\Dstarz	D^{*0}	\Dstarzb	$\overline{D}^{*0}$	\Dstarp	D^{*+}
\Dstarm	D^{*-}	\Dstarpm	$D^{*\pm}$	\Dstarmp	$D^{*\mp}$
\Ds	D_s^+	\Dsp	D_s^+	\Dsm	D_s^-
\Dspm	$D_s^\pm$	\Dss	D_s^{*+}	\Dssp	D_s^{*+}
\Dssm	D_s^{*-}	\Dsspm	$D_s^{*\pm}$	\B	B
\Bb	$\overline{B}$	\BBbar	$B\overline{B}$	\Bz	B^0
\Bzb	$\overline{B}^0$	\Bu	B^+	\Bub	B^-
\Bp	B^+	\Bm	B^-	\Bpm	$B^\pm$
\Bmp	$B^\mp$	\Bd	B^0	\Bs	B_s^0
\Bsb	$\overline{B}_s^0$	\Bdb	$\overline{B}^0$	\Bc	B_c^+
\Bcp	B_c^+	\Bcm	B_c^-	\Bcpm	$B_c^\pm$

B.2.6 Onia

\jpsi	J/ψ	\psitwos	$\psi(2S)$	\psiprpr	$\psi(3770)$
\etac	η_c	\chiczero	χ_{c0}	\chicone	χ_{c1}
\chictwo	χ_{c2}	\OneS	$\Upsilon(1S)$	\TwoS	$\Upsilon(2S)$
\ThreeS	$\Upsilon(3S)$	\FourS	$\Upsilon(4S)$	\FiveS	$\Upsilon(5S)$
\chic	χ_c				

B.2.7 Baryons

\proton	p	\antiproton	$\overline{p}$	\neutron	n
\antineutron	$\overline{n}$	\Deltares	Δ	\Deltaresbar	$\overline{\Delta}$
\Xires	Ξ	\Xiresbar	$\overline{\Xi}$	\L	Λ
\Lbar	$\overline{\Lambda}$	\Lambdares	Λ	\Lambdaresbar	$\overline{\Lambda}$
\Sigmares	Σ	\Sigmaresbar	$\overline{\Sigma}$	\Omegares	Ω
\Omegaresbar	$\overline{\Omega}$	\Lb	Λ_b	\Lbbar	$\overline{\Lambda}_b$
\Lc	Λ_c	\Lcbar	$\overline{\Lambda}_c$		

B.3 Physics symbols

B.3.1 Decays

\BF	$\mathcal{B}$	\BRvis	$\mathcal{B}_{\rm vis}$	\BR	$\mathcal{B}$
\decay[2] \decay{a }{b c }	$a \to bc$	\ra	$\to$	\to	$\to$

B.3.2 Lifetimes

\tauBs	$\tau_{B^0_s}$	\tauBd	τ_B	\tauBz	τ_B
\tauBu	τ_{B^+}	\tauDp	τ_{D^+}	\tauDz	τ_{D^0}
\tauL	$\tau_{\rm L}$	\tauH	$\tau_{\rm H}$		

B.3.3 Masses

\mBd	m_{B^0}	\mBp	m_{B^+}	\mBs	$m_{B^0_s}$
\mBc	$m_{B_c^+}$	\mLb	m_{Λ_b}		

B.3.4 EW theory, groups

\grpsuthree	SU(3)	\grpsutw	SU(2)	\grpuone	U(1)
\ssqtw	$\sin^2\theta_{\rm W}$	\csqtw	$\cos^2\theta_{\rm W}$	\stw	$\sin\theta_{\rm W}$
\ctw	$\cos\theta_{\rm W}$	\ssqtwef	$\sin^2\theta^{\rm eff}_{\rm W}$	\csqtwef	$\cos^2\theta^{\rm eff}_{\rm W}$
\stwef	$\sin\theta^{\rm eff}_{\rm W}$	\ctwef	$\cos\theta^{\rm eff}_{\rm W}$	\gv	$g_{\rm V}$
\ga	$g_{\rm A}$	\order	$\mathcal{O}$	\ordalph	$\mathcal{O}(\alpha)$
\ordalsq	$\mathcal{O}(\alpha^2)$	\ordalcb	$\mathcal{O}(\alpha^3)$		

B.3.5 QCD parameters

\as	α_s	\MSb	$\overline{\rm MS}$	\lqcd	$\Lambda_{\rm QCD}$
\qsq	q^2				

B.3.6 CKM, CP violation

\eps	ε	\epsK	ε_K	\epsB	ε_B
\epsp	ε'_K	\CP	CP	\CPT	CPT
\rhobar	$\overline{\rho}$	\etabar	$\overline{\eta}$	\Vud	$\lvert V_{ud}\rvert$
\Vcd	$\lvert V_{cd}\rvert$	\Vtd	$\lvert V_{td}\rvert$	\Vus	$\lvert V_{us}\rvert$
\Vcs	$\lvert V_{cs}\rvert$	\Vts	$\lvert V_{ts}\rvert$	\Vub	$\lvert V_{ub}\rvert$
\Vcb	$\lvert V_{cb}\rvert$	\Vtb	$\lvert V_{tb}\rvert$		

B.3.7 Oscillations

\dm	Δm	\dms	Δm_s	\dmd	Δm_d
\DG	$\Delta\Gamma$	\DGs	$\Delta\Gamma_s$	\DGd	$\Delta\Gamma_d$
\Gs	Γ_s	\Gd	Γ_d	\MBq	M_{B_q}
\DGq	$\Delta\Gamma_q$	\Gq	Γ_q	\dmq	Δm_q
\GL	$\Gamma_{\rm L}$	\GH	$\Gamma_{\rm H}$	\DGsGs	$\Delta\Gamma_s/\Gamma_s$
\Delm	Δm	\ACP	$\mathcal{A}^{\rm CP}$	\Adir	$\mathcal{A}^{\rm dir}$
\Amix	$\mathcal{A}^{\rm mix}$	\ADelta	$\mathcal{A}^{\Delta}$	\phid	ϕ_d
\sinphid	$\sin\phi_d$	\phis	ϕ_s	\betas	β_s
\sbetas	$\sigma(\beta_s)$	\stbetas	$\sigma(2\beta_s)$	\stphis	$\sigma(\phi_s)$
\sinphis	$\sin\phi_s$				

B.3.8 Tagging

\edet	$\varepsilon_{\rm det}$	\erec	$\varepsilon_{\rm rec/det}$	\esel	$\varepsilon_{\rm sel/rec}$
\etrg	$\varepsilon_{\rm trg/sel}$	\etot	$\varepsilon_{\rm tot}$	\mistag	ω
\wcomb	$\omega^{\rm comb}$	\etag	$\varepsilon_{\rm tag}$	\etagcomb	$\varepsilon_{\rm tag}^{\rm comb}$
\effeff	$\varepsilon_{\rm eff}$	\effeffcomb	$\varepsilon_{\rm eff}^{\rm comb}$	\efftag	$\varepsilon_{\rm tag}(1-2\omega)^2$
\effD	$\varepsilon_{\rm tag}D^2$	\etagprompt	$\varepsilon_{\rm tag}^{\rm Pr}$	\etagLL	$\varepsilon_{\rm tag}^{\rm LL}$

B.3.9 Key decay channels

\BdToKstmm	$B^0\to K^{*0}\mu^+\mu^-$	\BdbToKstmm	$\overline{B}^0\to \overline{K}^{*0}\mu^+\mu^-$	\BsToJPsiPhi	$B_s^0\to J/\psi\,\phi$
\BdToJPsiKst	$B^0\to J/\psi\,K^{*0}$	\BdbToJPsiKst	$\overline{B}^0\to J/\psi\,\overline{K}^{*0}$	\BsPhiGam	$B^0\to\phi\gamma$
\BdKstGam	$B^0\to K^{*0}\gamma$	\BTohh	$B\to h^+h^-$	\BdTopipi	$B^0\to\pi^+\pi^-$
\BdToKpi	$B^0\to K^+\pi^-$	\BsToKK	$B_s^0\to K^+K^-$	\BsTopiK	$B_s^0\to\pi^+K^-$

B.3.10 Rare decays

\BdKstee	$B^0\to K^{*0}e^+e^-$	\BdbKstee	$\overline{B}^0\to \overline{K}^{*0}e^+e^-$	\bsll	$b\to s\ell^+\ell^-$
\AFB	$A_{\rm FB}$	\FL	$F_{\rm L}$	\AT#1 \AT2	$A_{\rm T}^2$
\btosgam	$b\to s\gamma$	\btodgam	$b\to d\gamma$	\Bsmm	$B_s^0\to\mu^+\mu^-$
\Bdmm	$B^0\to\mu^+\mu^-$	\ctl	$\cos\theta_l$	\ctk	$\cos\theta_K$

B.3.11 Wilson coefficients and operators

\C#1 \C9	$\mathcal{C}_9$	\Cp#1 \Cp7	$\mathcal{C}_7'$	\Ceff#1 \Ceff9	$\mathcal{C}_9^{(\mathrm{eff})}$
\Cpeff#1 \Cpeff7	$\mathcal{C}_7'^{(\mathrm{eff})}$	\Ope#1 \Ope2	$\mathcal{O}_2$	\Opep#1 \Opep7	$\mathcal{O}_7'$

B.3.12 Charm

\xprime	x'	\yprime	y'	\ycp	y_{CP}
\agamma	A_Γ	\kpi	$K\pi$	\kk	KK
\dkpi	$D \to K\pi$	\dkk	$D \to KK$	\dkpicf	$D^0 \to K^-\pi^+$

B.3.13 QM

\bra[1] \bra{a} $\langle a|$ \ket[1] \ket{b} $|b\rangle$ \braket[2] \braket{a}{b} $\langle a|b\rangle$

B.4 Units

\unit[1] \unit{kg} kg

B.4.1 Energy and momentum

\tev	TeV	\gev	GeV	\mev	MeV
\kev	keV	\ev	eV	\gevc	GeV/c
\mevc	MeV/c	\gevcc	GeV/c^2	\gevgevcccc	GeV^2/c^4
\mevcc	MeV/c^2				

B.4.2 Distance and area

\km	km	\m	m	\cm	cm
\cma	cm^2	\mm	mm	\mma	mm^2
\mum	μm	\muma	μm^2	\nm	nm
\fm	fm	\barn	b	\barnhyph	−b
\mbarn	mb	\mub	μb	\mbarnhyph	−mb
\nb	nb	\invnb	nb^{-1}	\pb	pb
\invpb	pb^{-1}	\fb	fb	\invfb	fb^{-1}

B.4.3 Time

\sec	s	\ms	ms	\mus	μs
\ns	ns	\ps	ps	\fs	fs
\mhz	MHz	\khz	kHz	\hz	Hz
\invps	ps^{-1}	\yr	yr	\hr	hr

B.4.4 Temperature

\degc	°C	\degk	K

B.4.5 Material lengths, radiation

\Xrad	X_0	\NIL	λ_{int}	\mip	MIP
\neutroneq	$\mathrm{n_{eq}}$	\neqcmcm	$\mathrm{n_{eq}/cm^2}$	\kRad	kRad
\MRad	MRad	\ci	Ci	\mci	mCi

B.4.6 Uncertainties

\sx	σ_x	\sy	σ_y	\sz	σ_z
\stat	(stat)	\syst	(syst)		

B.4.7 Maths

\order		$\mathcal{O}$	\chisq	χ^2	\deriv		d
\gsim		$\gtrsim$	\lsim	$\lesssim$	\mean[1]	\mean{x}	$\langle x \rangle$
\abs[1]	\abs{x}	$\|x\|$	\Real	$\mathcal{R}e$	\Imag		$\mathcal{I}m$
\PDF		PDF					

B.5 Kinematics

B.5.1 Energy, Momenta

\Ebeam	E_{BEAM}	\sqs	$\sqrt{s}$	\ptot	p
\pt	p_{T}	\et	E_{T}	\dpp	$\mathrm{d}p/p$
\dedx	$\mathrm{d}E/\mathrm{d}x$				

B.5.2 PID

\dllkpi	$\mathrm{DLL}_{K\pi}$	\dllppi	$\mathrm{DLL}_{p\pi}$	\dllepi	$\mathrm{DLL}_{e\pi}$
\dllmupi	$\mathrm{DLL}_{\mu\pi}$				

B.5.3 Geometry

\mphi	ϕ	\mtheta	θ	\ctheta	$\cos\theta$
\stheta	$\sin\theta$	\ttheta	$\tan\theta$	\degrees	$^\circ$
\krad	krad	\mrad	mrad	\rad	rad

B.5.4 Accelerator

\betastar	β^*	\lum	$\mathcal{L}$	\intlum[1]	\intlum{2 fb^{-1} }	$\int \mathcal{L} = 2$ fb^{-1}

B.6 Software

B.6.1 Programs

\evtgen	EvtGen	\pythia	Pythia	\fluka	Fluka
\tosca	Tosca	\ansys	Ansys	\spice	Spice
\garfield	Garfield	\geant	Geant4	\hepmc	HepMC
\gauss	Gauss	\gaudi	Gaudi	\boole	Boole
\brunel	Brunel	\davinci	DaVinci	\erasmus	Erasmus
\moore	Moore	\ganga	Ganga	\dirac	Dirac
\root	Root	\roofit	RooFit	\pyroot	PyRoot

B.6.2 Languages

\cpp	C++	\python	Python	\ruby	Ruby
\fortran	Fortran	\svn	SVN		

B.6.3 Data processing

\kbytes	kbytes	\kbsps	kbits/s	\kbits	kbits
\kbsps	kbits/s	\mbsps	Mbytes/s	\mbytes	Mbytes
\mbps	Mbyte/s	\mbsps	Mbytes/s	\gbsps	Gbytes/s
\gbytes	Gbytes	\gbsps	Gbytes/s	\tbytes	Tbytes
\tbpy	Tbytes/yr	\dst	DST		

B.7 Detector related

B.7.1 Detector technologies

\nonn	n^+-on-n	\ponn	p^+-on-n	\nonp	n^+-on-p
\cvd	CVD	\mwpc	MWPC	\gem	GEM

B.7.2 Detector components, electronics

\tell1	TELL1	\ukl1	UKL1	\beetle	Beetle
\otis	OTIS	\croc	CROC	\carioca	CARIOCA
\dialog	DIALOG	\sync	SYNC	\cardiac	CARDIAC
\gol	GOL	\vcsel	VCSEL	\ttc	TTC
\ttcrx	TTCrx	\hpd	HPD	\pmt	PMT
\specs	SPECS	\elmb	ELMB	\fpga	FPGA
\plc	PLC	\rasnik	RASNIK	\elmb	ELMB
\can	CAN	\lvds	LVDS	\ntc	NTC
\adc	ADC	\led	LED	\ccd	CCD
\hv	HV	\lv	LV	\pvss	PVSS
\cmos	CMOS	\fifo	FIFO	\ccpc	CCPC

B.7.3 Chemical symbols

\cfourften	C_4F_{10}	\cffour	CF_4	\cotwo	CO_2
\csixffouteen	C_6F_{14}	\mgftwo	MgF_2	\siotwo	SiO_2

B.8 Special Text

\eg	*e.g.*	\ie	*i.e.*	\etal	*et al.*
\etc	*etc.*	\cf	*cf.*	\ffp	*ff.*