# Karl Warburton – Minor and Typographic Corrections etc

Generally well written, with good grammar and accuracy. However, there is a serious surplus of commas! Very many sentences have completely redundant commas, which make the text less readable. These should simply be removed. There are also a few cases where two complete sentences have been joined by a comma; in these cases, the comma should be replaced by a semicolon or full-stop. Most of these punctuation errors are **not** listed below. (I am not insisting that you correct all the commas, but it would be a distinct improvement to the thesis! I leave it to you.)

**Declaration**

iii "**high** level summaries"?

iv "author's".

**Abstract**

vi "a system … **was** installed".

**Chapter 1**

p. 2 (Why "neutrinos *should* have a non-zero mass"?)

"Chapter 4 … **concludes** with".

p. 3 "then they should produce".

p. 4 "… flux was lower than predicted meant that". Example of removal of redundant comma.

p. 6 ("Taylor expansion **of**", rather than "about"?)

p. 14 "they make; this will" Example of comma which should be semicolon (or full-stop).

p. 15 Hyphen used instead of minus in couple of places.

**Chapter 2**

p. 35 "current … currently"?

Muon decay formula?

p. 36 "fiducial **mass** of".

p. 38 collecting charge **from**".

"This orientation allowed both …" (not "allowed for".)

p. 42 "most highest"??

**Chapter 3**

p. 51 Hyphen used instead of minus in "−40°C".

p. 54 "**run** unsupervised" rather than "ran"?

**Chapter 4**

p. 60 "by summing the". (Delete "the".)

p. 66 "The **criterion** … has to be".

p. 67 Caption of fig 4.5: "a function **of** the"? MPV not shown. "the **two** induction planes"?

p. 68 Does "with regards to" mean "as a function of"?

"paths are **run** on".

p. 73 Is 6 sig. figs. justified for the drift speed?

p. 76 "**classical** radius of the electron"??

"momentum … is" (or "momenta are") twice.

p. 77 "*A*" and "*b*" should be italicised consistently.

Units of *A* incorrect throughout this chapter (in at least two different ways!). This affects figure axis labels and text.

Hyphen used instead of minus in table and in text.

p.78 "NIST" in figure undefined.

"to **be** cleanly separated".

p. 79 "short **tracks**" not "particles". (Also p. 81.)

"This allows a sample" (not "for").

p. 81 Is "width" σ, FWHM, or what?

p. 83 Spurious "and so" (the second occurrence).

the particle's trajectory".

p. 85-6 Several references to "the PIDA range" before it is defined.

p. 86 "the efficiency **with** which".

p. 88 strange combination of ' and "!

p. 90 New incorrect units for PIDA!

"much longer than themselves"?

Odd wording after "seen from Figs 4.19a and 4.19b". Word order wrong?

p. 92 Fig. caption has ratio given in cm.

"which can **be** reliably identified".

**Chapter 5**

p. 108 "This follows" (delete "is").

p. 110 "0 to 9", not "0 to 10".

p. 112 "**its** associated tracks"

"in Figure 5.9" not 5.10?

p. 117 "width" used inconsistently between top of page and last paragraph.

"Earth's surface".

p. 121 "drift distance dependence **of** hit RMS".

"This angular dependence … **shows** that".

p. 122-3 Confusion of "normalised plot of hit charge" and "plot of normalised hit charge" in multiple places (also p. 132).

p. 130 "again **ascribed** to" not "prescribed"!

p. 132 "seen **in when** considering **the only** 35 ton dataset" is very confused!

p. 146 "highly **dependent**". ("dependant" is a noun.")

**Chapter 6**

p. 149 "The author's work".

p. 150 "CPAs" (no apostrophe).

p. 151 "has **been** performed."

p. 152 "a series of cuts … **has** to be".

p. 153 "be able to **be** used".

p. 154 Sudden change from "photon" meaning gamma ray to meaning scintillation light!

p. 156 "at **first** glance".

p. 157 “energy **dependent** cut”.
p. 159 Missing number after “10599±”.
p. 160 “which **either** enter **or** miss”. (One muon cannot do both!)
p. 162 “A range … **is** considered”.
p. 170 “result in the … position **being** shifted”.
p. 172 “a second **criterion**”, “This **criterion**”.
“then **its** kinetic energy”.
p. 173 Presumably means “0.44 events/(Mt.year)”?
Is it “**from** an exposure of” rather than “to give”?
p. 188 Errors in equations for momentum.
Units of momentum should really be MeV/*c*.
“its energy and **momentum**.”
p. 197 “which are removed **are lost** due to”???
Reference to Fig 6.15 means 6.14.

**References**

Make sure you are consistent with journal names. E.g. “Nuclear Instruments and Methods in Physics Research” is also sometimes “Nucl. Instrum. Meth.” (I think the abbreviated version is more consistent with other journal names.)

[74] Why block capitals.
[104] Spelling “collaboration”.
[113] as [74].
[118] Where is this published?
[145], [147], [149], [155], [179], [181]-[184] Working group of what? Where available?
[151] No space in “multi-strip”.
[159] As [118].
[178] Spelling “nucleon”.
[179] “et al.” for consistency with others.