

Samuel Hall: Corrections

- p1, 1st para: 'Universe look the way...' ; p2 '..are indications of..'
- p4, 3rd para: 'electric charge beingfrom U(1) invariance'
- p5 charm and strange masses wrong. State what type of mass they are.
- p10 reference values for Lambda and A
- Check theory behind (2.31) and role of theta in particular
- Chapter 2: include more performance parameters especially for the tracking detectors (point resolution, vertex resolution, momentum resolution). Clearer statement of the PID performance than Fig 3.7. Consider putting in a table.
- Eqn. (3.6) is clearly wrong
- More details needed of the simulation (both detector and generator level). What are the LHCb-specific tunings? Show some data vs simulation comparison examples.
- p33: NN's can also handle weighted inputs and exploit non-linear correlations
- eqn. (4.1) define epsilon and check (4.2) follows
- In general use term 'uncertainty' instead of 'error' and 'simulation' instead of 'Monte Carlo'. Don't label axes 'arbitrary' - there is always some variable the plot is a function of. For plots normalised to area of 1, the y-axis should be: $1/N_{tot}dN/dx$ for N the bin contents and dx the bin width in variable x . Run the complete text through the spell-checker again.
- Eqn 4.4 and 4.6 are just the arithmetic mean and variance, not weighted. Square missing off 4.7
- Fig. 5.1: final state quarks and arrow direction wrong in both Feynman graphs

- p43 and later: make sure that analysis input from elsewhere is clearly referenced or else more levels of justification for analysis choice, like selection cuts, will be needed.
- p44 Justification for the assumption that only combinatorial background populates the upper sideband needs to be given.
- p46 The definition of h_i needs to be clearer.
- p59, 1st para: consider something like ‘Since in 2011 30% more data was taken in one polarity over the other, there could be an effect.’
- p60 make a statement about the simpler channels such as $B \rightarrow K\mu\mu$ and $B_s \rightarrow \phi\mu\mu$.
- p64: If the χ^2 cuts are absolute values, you must quote the number of degrees of freedom.
- Fig. 6.5: clarify the statement regarding both pions in the same histogram.
- p68: detail how the optimisation was done in the 3D space of the PID variables
- Fig. 6.7: Expand on the reasons why the agreement is so bad.
- Fig. 6.9: efficiency values are rather unreadable.
- Fig. 6.11: is this figure only referenced later on p79? If so, move closer.
- Tab. 7.1: S does not appear in the table.
- p84: ‘It is known that the SM is a gauged field theory...’
- Fig. 7.1: There is a lot of information on this plot and some statements need to be made to motivate the meaning behind the labels present.
- Fig. 7.2: fix caption i.e. ‘or need to mix’??
- p86 3rd para: Re-word sentence starting ‘However this suppression....’
- p87: Motivate the choices made for values of σ_m and the intervals chosen to represent signal and data.
- p88: Elaborate on why a profile likelihood is introduced at this point.
- p89: What is the ‘look-elsewhere’ effect?
- p90: I did not understand the first half of this page. There is also a missing reference.
- p91,92: explain how the choices for x, σ_y are arrived at.
- missing ref. in caption to Fig. 7.4. Typo in y-axis label.
- Tab 7.5: define P_{gh} and reference (or explain) how these values were selected.
- Fig. 7.15: Caption, red→blue
- p107: Explain what is meant by ‘SM analysis’.

- p110 onwards. Decide how to handle setting new limits from this analysis. Best option is to calculate for this analysis but, if this involves significant new work, quote the publication draft result with a clear dis-claimer.
- p113: Your BR result is compatible with the SM value mainly because of the large statistical uncertainty not theoretical.
- p114, line 3: drop word ‘perfectly’.
- p115, para 2: Have a think about what you want to say and (at least) re-word the sentence, ‘Considering the current’ plus the sentence starting, ‘The idea that nature is natural...’