Larger Issues for Public Reading Discussion

Dispatch 1863

Thank you to everyone who commented on dispatch 1863. I beleive the typos, grammatical corrections and suggested improvements for clarity can be (in most cases have now been) applied to the dispatch without difficulty or controversy. I have compiled a list of the suggestions for more substantive changes that have been submitted to me, for a more full discussion during the public reading.

1: Section 1, Paragraph 2,

– References for other α_s determinations

Comments (Otmar, Thorsten)

- reference very specific publications for low energy α_s determinations
- no references for high energy determinations

Proposals

1. add references to high energy determinations(e^+e^-, pp, $p\bar{p}$, or ep)
2. remove low energy references, replace with a more general reference, ie [49]. $\Rightarrow$Add sentence: A more complete description of these methods of determining $\alpha_s(\sqrt{s})$ is given in [49]. $\Leftarrow$ ***My preference***

2: Section 3.2, Paragraph 2,

– Data samples and combinations

Comment(David): is the luminosity-weighted c.m. energy the correct thing to use? Shouldn't we quote the c.m. energy weighted by the number of selected events (which will be lower)?

3: Section 3.2, Paragraph 2,

– Description of MT package

Comment(Otmar): I feel it's sufficient to mention the MT algorithm and to have a reference to it. You don't need to describe it in such detail. Just

say that 'MT matches tracks to clusters and accounts/compensates for the double counting of energy from charged particles measured by the tracking chambers and by the calorimeters.'
Option 1: Since the details of the MT algorithm are not used later and they are more completely described in the references, include only a couple of sentences to mention MT and reference it.
Option 2: Include the "full" detail as described in the original note or more appropriately using Pippa's suggested rephrasing

4: Section 3.3, Paragraph 4,

– Monte Carlo corrections

Comment (David) line 3+ - "distributions" This discussion seems a bit out of place here, because we don't introduce the distributions to be corrected until sect 4. Also the whole phrasing in terms of distributions and bins seems a bit odd, when the basic things we measure aren't binned like a histogram, they are jet rates at fixed values of ycut. Then the Dn's and <N>'s are derived from these.

Proposal Move Section 4 to precede Section 3 this will help define the distributions that are being used. It will also improve the over flow: selection to correction to systematic variations without a digression into the jet rate definition. It may also be helpful to indicate (as done in the event shapes draft) that a values for Rn, Dn and <N> are determined for each event as functions of ycut and are subsequently saved in a histogram, for instance add the following to the top of Paragraph 1:
"The values of R_n, D_n and $\langle N \rangle$ are determined for each accepted event in the data sample as a function of y_{cut}, using the MT corrected tracks and clusters. These values are then compiled into histograms with bins of varying size of y_{cut}."

5: Section 4, Paragraph 1,

– Description of jet clustering algorithms

Comment(Otmar): drop this whole paragraph (including the two lines on p.7). It's more than sufficient to have the references for Durham, Cambridge, and JADE.

Option 1: keep the description - an analysis that relies on jet clustering should probably include a small section on how it was done. **Option 1**: drop description and use only a reference - these are well established algorithms and understanding their details is not really relevant to the overall α_s determinations.

6: Section 5.3, Paragraph Log rescaling,

Comment(General): Does the footnote(2) need further clarification that in fact only the x_μ are used in the determination of the theoretical systematic?

7: Section 5.3, Paragraph Last,

Comment(Otmar): Your description is unclear in that it does not explain what you did about asymmetric errors (e.g. from x_mu or hadronization). And, as I already said, in particular at 91 GeV your way of symmetrizing the hadronization error is over-conservative.

8: Section 6, Paragraph 1,

– Introduction to results

Comment(Otmar, David): This whole paragraph repeats what has been already stated in previous sections. So it could be dropped or moved to the summary or to the introduction.
Option 1 Given that this paragraph is mostly repeating what was stated previously and the following paragraph mentions things that haven't yet been introduced - perhaps it is best indeed just to drop these paragraphs?
Option 2 Keep the paragraph as a quick reminder of the salient points about the selection process

9: Section 6.2.1, Paragraph 1,

– Differential two jet rates

Comment(Pippa): I wondered if your equation (7) shouldn't be moved earlier in the paper, to where you first define the differential jet rates.
Option 1: Move into section 4
Option 2: Keep it here and remind the reader that this is the way the fit handles the theoretical prediction
Option 3: Remove altogether as it is somewhat repetitive of eqn(4) and can lead to some confusion

10: Section 6.2.1, Paragraph 2,

– Differential two jet rates

Comment(David): In general, I'm a bit worried about the decision to use different fit ranges (in general) at each c.m. energy. I would have thought this could lead to systematic shifts from energy to energy. Admittedly these would be covered by the systematic errors, but it seems to throw away unnecessarily some of the benefits of performing a common analysis over all energies.

11: Section Appendix,

Comment(Otmar, Gabi): Frankly speaking, you don't need this appendix. There is nothing substantially different compared to appendix B of [11] apart from your description of the R-matching, which you don't use actually. So, drop this appendix completely !
Option 1: Remove the appendix and reference [11] for a more complete description of the theory that is used (noting of course the typo on the $\langle N \rangle$ NLLA description)
Option 2: My preference at this point is to keep the theoretical description, personally I find it a bit frustrating sometimes when reading an experimental paper having to search into another reference to get the basics of the theoretical motivations of the paper, this is however a just personal opinion.

12: Section Tables 1,

Comment(David): is it useful to give all these numbers of events?
Option 1: Keep the events listed for the Monte Carlo as a reference to the potential impact of Monte Carlo statistics on the analysis
Option 2: Remove the columns and replace with the expected number of events determined from Monte Carlo.

13: Section Tables 2,

Comment(David): is the "non-rad purity" a really useful number to give?

14: Section Tables 2,

Comment(David):Table 5 - My biggest comment - why do the errors differ so much from Matthew's? I know the fit ranges are different (slightly), but otherwise we use the same data, and the same procedures. Your statistical errors are all larger, and so are the hadronization and theory errors, by a large amount. We can't possibly publish until this is understood.

15: Section Figures 3 - 11,

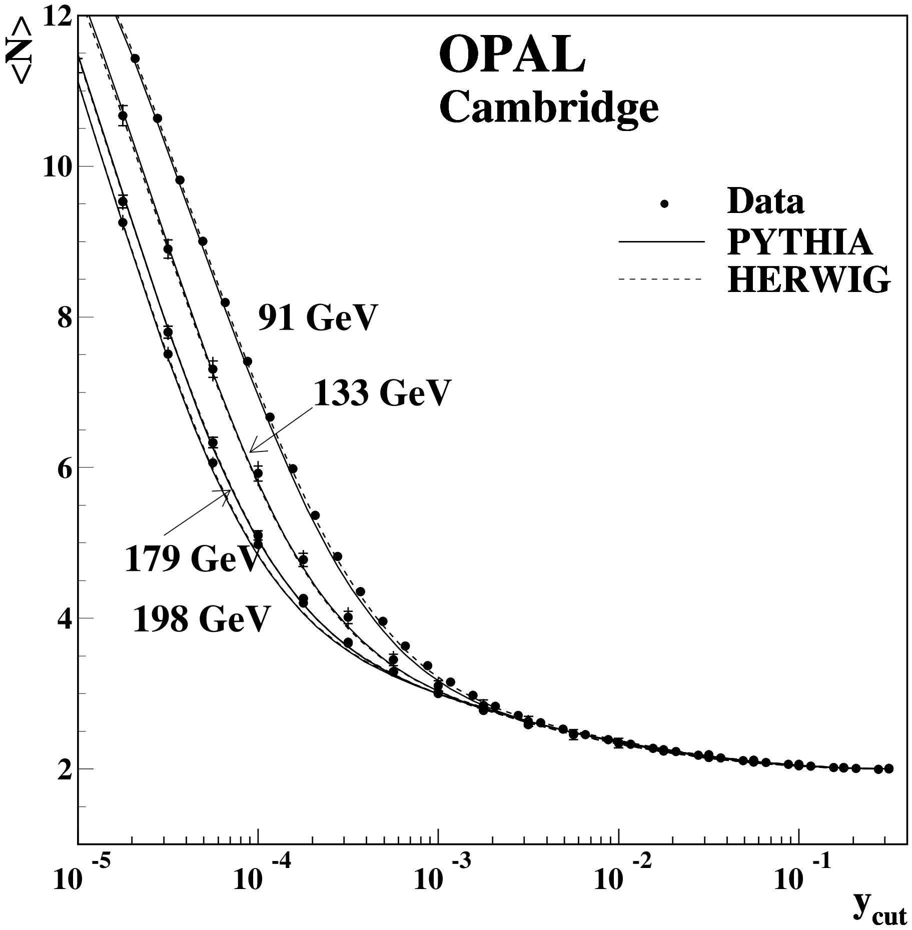
Comment(David, Otmar) Personally I would like to see some of these final OPAL measurements tabulated. I assume you discussed this, and decided otherwise?
Reply I would like to avoid adding tables for the existing plots as this would add several pages (10 to 14). I feel it would be much easy to add these table of numbers to the Durham database as was done for PR299.

16: Section Figures 10 - 11,

Comment(Otmar): Couldn't one merge Cambridge $\langle N \rangle$ from all energies into a single figure (and likewise for all Durham $\langle N \rangle$)?
Reply: I have generated a plot with all four energies on one, it is a little cluttered, but perhaps can be improved somewhat.

17: Section Figures 14 - 15,

Comment(Otmar, Gabi): could you add the same kind of inserts showing fit residuals to these figures?
Option 1 Include pull distribution in inset for $\langle N \rangle$ distribution for symmetry with the D_2 distributions and note in the caption that since the bins are highly correlated the pulls have little relation to the quality of the fit.
Option 2 Leave pull distributions absent and note in the caption they where omitted because of the large bin-to-bin correlations.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Cambridge
Data
PYTHIA
HERWIG
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179 GeV
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