Comments from Ante for v3.0 and Answers

==========

Abstract

9 "The results were obtained with the multi-particle cumulant method." => "The results were obtained with the new multiparticle method dubbed symmetric cumulants."
done

10 "The method" => "This method"
done
13 See if you can drop here "model" (since there is "models" immediately afterwards)
done
14 See if you want to split large sentence "The comparisons..." in two or even three smaller ones
done
15 \eta/s is used before being defined
defined
16 flavored => favored
fixed
16 Is anything special about "AMPT initial condition"? If not, perhaps we can spell out immediately the details of most successive Glauber configuration for initial conditions
this is special, it is described in the model description.
o What is clearly missing in the abstract in some executive summary for pT dependence (e.g. is it trivial, non-trivial, same trends for all correlations, etc.)
yes, i try to add it but forgot it.
I prepared as following and try to improve it a bit later.
We have found that v_3-v_2 and v_4-v_2 correlations have moderate $p_{\rm T}$ dependence in mid central collisions. This might be an indication of possible viscous corrections for the equilibrium distribution at hadronic freeze-out.

==========

1 Introduction

21,28,54 "heavy ion" => "heavy-ion"
done
23 "matter" => "nuclear matter"
done
24 "transverse plane, driven" => "plane transverse to the beam direction, which is driven"
done
24 "pressure" => "anisotropic pressure"
done
24 "with more" => "resulting in a more". Btw, is this really so: Do we have the same number of particles, just particles in the direction of largest gradients

are pushed faster?

26 in => at
fixed
28 "strongly interacting matter" => “QGP"
done
30 I feel that the transition to paragraph 2 is a bit too sharp, in a sense that it is not clear why all of a sudden temperature dependence of \eta/s is so important. To motivate it, perhaps we can advocate that otherwise it is very difficult to understand why ideal hydro worked better at RHIC than at LHC. For a help to formulate this, we can ask Pasi Huovinen (I see later that you have discussed this in lines 56-58)
i reshuffled the order, will try to bridge them smoothly
31 "One such general behavior is that" => "For instance, “
done
31 "ratio" => "it" (note that you refer to "temperature dependence", not to "ratio"). If you adopt this suggestion, than please change on the same line "its" into “the"
ratio
33 "an order" => "the correct order”
done
33 "shear viscosity to entropy ratio" => "value found”
done
34 found => demonstrated
done
34 "one can calculate" is too colloquial, see if you want to replace this with "can be calculated", and pull it just before “using"
done
35 supports => support
done
36 see if you want to drop “indeed"
done
36 "to other" => "for other”
fixed
38 "QCD" abbreviation is not defined
done
40 Again, transition to this paragraph is too sharp. Perhaps at the end of previous paragraph you could write that we can probe \eta/s by studying non-trivial collective properties of QGP, like anisotropic flow, and then naturally in the next paragraph you start describing what is anisotropic flow
yes, after i changed the oerder of the phragraph, it looks better, originally it was intended differently ^;;
I will try to bridge them smoothly ...

40 See if immediately after "Anisotropic flow" you want to
cite http://inspirehep.net/record/31918/
done
41,44 Please unify the notation for symmetry planes

i think it is ok.
46 derived => calculated
done
46 "flow" => "flow in heavy-ion collisions", and "response" => "response of produced matter”
done
47 deformation => deformations
done
47 I think we need to specify "density" of what, perhaps "energy density”
yes, it should be energy density
50 fluctuation => fluctuations
done
50 "higher" => "higher flow”
done
51 Besides ATLAS, I would cite here also https://arxiv.org/abs/1212.1008
done
52 "[19,20]." => "[19,20], while correlations have the potential to discriminate the two respective contributions to anisotropic flow development [cite https://arxiv.org/abs/1212.1008]”
done
52 See if you want to drop the sentence "And ...", or at least rephrase it, it doesn't read well in the current form
54 on => in
i am not sure, it should be “on” ?
54 "shear viscosity" alone or the ratio?
changed to eta/s
54 "has been realized since it" => "collisions can be attributed mostly to the fact that it”
done
55 "of the" => "for the”
i think it is correct.
55-56 Is this statement true for anisotropic flow, or only for elliptic flow? (The same comment for sentence in 58-59)
This is a good question, only it was demonstrated for v2 in the papers cited, but i think it should be similar as others aw well.
Quantitively it will be different but the general trend should be.
61 "The higher harmonics" => "While elliptic and triangular flow can be described well solely in terms of linear response, the higher harmonics". Btw, I fear that before starting to speak about linear and nonlinear response, most likely we will need to introduce eccentricities, etc
Let’s me see if i can add few sentences there.
62 "lower-order" => "lower order”
done
62 "harmonic order" => "order of harmonic”
done
65 If it's not used afterwards in the text, see if you want to drop "\delta f". If you adopt this suggestion, then just pre-pend "which is”
to "a correction”

done
69 "Recently we measured" => "Recently, the ALICE Collaboration measured" (and that somewhere in this sentence add citation)
done
73 expending => expanding
done
73 "and simultaneous" => "and therefore simultaneous”
done
75 "the analysis" => "that analysis”
done
45,76 Please unify the notation for “th"

done

76 "as well as" => "as well as to”
done
77-81 It is not mentioned what is done in Sec. 3
added.

==========

2 Data Analysis
2.1 Experimental observables
101-102 this is now the repetition of 69-70 and therefore could be dropped
done
105 Perhaps here then you could append at the end of the paragraph: The SC observables are defined as:
%
\begin{eqnarray}
\left<\left<\cos(m\varphi_1\!+\!n\varphi_2\!-\!m\varphi_3-\!n\varphi_4)\right>\right>_c &=&
\left<\left<\cos(m\varphi_1\!+\!n\varphi_2\!-\!m\varphi_3-\!n\varphi_4)\right>\right>\nonumber\\
&&{}-\left<\left<\cos[m(\varphi_1\!-\!\varphi_2)]\right>\right>\left<\left<\cos[n(\varphi_1\!-\!\varphi_2)]\right>\right>\nonumber\\
&=&\left<v_{m}^2v_{n}^2\right>-\left<v_{m}^2\right>\left<v_{n}^2\right>\,,%\nonumber\\
%&=&0\,.
\label{eq:4p_cumulant}
\end{eqnarray}
%
with the condition $m\neq n$ for two positive integers m and n. The complete discussion can be found in Section IV C of Ref. [citation to https://arxiv.org/abs/1312.3572]
done

113 Insert "in Eq.~(<reference to above equation>)" before "the pseudorapidity”
done
129 The meaning of V_4 and V_2 is clarified a bit in the parentheses, I think for the first round with IRC this is OK, so let's see then if they will insist on a more verbose explanation. I still plan to expand this paragraph with summary of few more theoretical papers which analyzed recently, this is coming, perhaps not by the start of first round with IRC

ok
==========

2.2 Event and Track Selection

150 "pseudo-rapidity" => "pseudorapidity" (since you have it that way in 44 and 111)
151 "triggering, and" => "triggering and"
157 "The charged particle track reconstruction efficiency and contamination" => "The reconstruction efficiency and contamination of charged particles"
158 "and found" => "and were found"
160 "80 \pm 5%" => "(80 \pm 5)%" (I think)
164 "cut-off was" => "cut-off of 5 GeV/c was"

done
==========

2.3 Systematic uncertainties

170 "uncertainties" => "Uncertainties" (if so, then I think also in 83 "observables" shall be replaced with "Observables")
172 "Each" => "All"
179 "TPC" abbreviation was already introduced in 149
181 "," => ", and”
done
182-184 See if you can improve this description, it doesn't read well. Btw, the font of z shall be z
As described in Sec.~\ref{sec:experiment}, the reconstructed vertex position in beam axis (z-vertex) is required to be located within 10 cm of interaction point (IP) to ensure
an uniform detector acceptance for the tracks within $|\eta|<0.8$ for all the vertices. The systematic uncertainty from z-vertex cut was estimated by reducing the z-vertex to 8cm and was found to be less than 3\%.
185 filed => field
185 "they" => "the resulting data sets”
186 "Both magnetic polarization events" => "Events with both magnetic polarizations"
190 Put "T" in the subscript in Roman font (as in 160, for instance)
191 "polarizations, reconstruction" => "polarizations and reconstruction"
193 "tracking" => "tracking possibilities" (or something analogous)
194 "one" => "the first" (I think)
194 "described" => "as described"
195 "ITS" was not introduced
done
196 I fear we will be asked to drop this statement on parts of SPD being switched off, or to elaborate in further detail what happened
let me see, i am not sure at this moment.

197 "recover" => "correct for"
199 "combine" => "combined"
201 "up" => "of up"
202 I think you can safely drop "correlation"
203 "all charged" => "both charged"
204 Do we have to pre-pend "about" (or "round") before 7% and 20%? Same comment applies to numbers in 210
208 "force to have detector inefficiencies" => "enforce detector inefficiencies"
210 "uncertainty" => "uncertainties"
211 "systematics" => "systematic"
211 large => larger
211 "than the" => "than for the"
212 "sensitive" => "more sensitive"
212 "with n" => "with n increasing."
213-215 It is unclear to me what you want to say in this sentence, see if you can rephrase...
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213-215 It is unclear to me what you want to say in this sentence, see if you can rephrase...

done.
==========

3 Theoretical models
237 See if you want to append at the end of sentence "as a function of transverse momentum."
done
244 Drop either "framework" or "model"
dropped the framework
244 "collision" => "collisions"

done
246 Perhaps its better to replace "fluid" with "state" or "phase" or "matter" or …
-> phase
246 "fluid-dynamics" => "fluid dynamics" (see 240)
done
246-247 See if you want to drop "well" and "some well-chosen", because this is self evident
-> some
250 parametrizations => values
done
252 "assumes the" => "assumes that the"
done
254 "Monte-Carlo" => "Monte Carlo" (we have it this way in short SC paper)
done
237 "position" => "coordinate"
done
272 Do we need to define "ZPC"?
probably not.
273 "final-state" or "final state" (like in 336, 418,…)
done
275 What "A" in "ART" corresponds to? If it is just "a", then in the previous line the last "a" => "A"
->A
282 It is not clear to what "measurements" you refer to here? If you refer to the ones enlisted in the first part of the sentence, then perhaps "the measurements" => "these measurements"
right, now i specified them in the sentence.
284 "The detail configurations on AMPT" => "The details of configurations of AMPT"

done.
==========

4 Results
289 "," => " and "
done
289 "which are the same as the published results" => "which are taken from the recent publication"
done

290 "as similarly as ... while" => ", and similarly for ... , while"
done

291 "others" => "other correlations"
done
290-292 See if you want to maintain the ordering between pair of harmonics in

each case, i.e. higher harmonic first, lower harmonic second (you have it this way in 288-289)

293 "lower order harmonics" => "lower order harmonic correlations”
done
294 "Especially" => "In particular”
done
297 "))" => “)"
done
297 "is comparable" => "magnitude is comparable”
done
298 I think at the end of sentence you need to insert a pointer to figure from which this can be seen
done
Fig. 1 (rhs): In the title on the y-axis, see if you want to maintain the same ordering between "m" and "n", both in numerator and numerator, for aesthetic reasons only, even mathematically it is all the same (and in fact, you have the ordering preserved in the legend for all five cases! Also later in Fig. 2, top right and bottom right)
Fig. 1, caption: a) see if you need to append "collisions at" after "Pb-Pb"; b) "," => " and "; c) Perhaps also in the caption you can indicated that results in colorful bands are taken from https://arxiv.org/abs/1604.07663 ; d) Since you have indicated what is the error in LHS, perhaps you can briefly comment what is the error reported on RHS (e.g. combined in quadrature statistical and systematic error)
good eyes, yes it will be changed.
300 "the individual flow strength" => "because of the strength of individual flow harmonics”
done
301-302 see if you want to replace "correlation" with "normalized correlation" (2x)
done
302 Before moving to pT dependence, and if possible, here we could still discuss a bit about the overall centrality dependence, i.e. flat, linear increase, etc., both for SC and NSC, especially if we can attach some nice physical reason to it

303 "apply" => “vary"
done
304 "interval" => "interval,”
done
305 "with" => “for"
done
305-306 Do you need to specify units for pT?
done
Fig. 2 "/c" => "/c" everywhere (22x)
done also elsewhere
307 "fluctuation" => “fluctuations”

done
307-308 I think it would be great if we could link this results with the result that fluctuations of individual flow harmonics are nearly pT independent, see Fig. 3 in https://arxiv.org/pdf/1205.5761v3.pdf , to leading order just a make a statement a la "which is strikingly different from pT dependence of individual flow harmonics, which is nearly flat (see Fig. 3 in <link to above paper>)", or something similar
This is not clear to me, i think you meant it for NSC. I don't have any quantitive statement but i tried to write in the following sentences that it comes from individual flow harmonics.
Based on https://arxiv.org/abs/1605.08303, Fig7, they have observed also pt dependence as shown in harri's paper,https://arxiv.org/abs/1212.1008 , i have asked author to give us the calculations based on our pt cut today. The origin of the cause is not written in both papers.
Originally I tried to add a connection to line 82-88
a.l.a https://arxiv.org/abs/1004.2023, https://arxiv.org/abs/1206.1905 also mentioned in a similar passion in https://arxiv.org/abs/1505.02677… so called bulk viscosity, delta f correction.
But I am not sure how we should address this at this moment.

308 First part of the sentence "This..." appears to be broken
right, i removed the first one, that was just a leftover sensentence..
315 "bottom" => "bottom row" or "bottom panels"
bottom panels
315-316 "as similarly as" => "as for the"
done w/o "the"
315 See if you need to append units after 0.8

done

To be continued (tomorrow)...

Cheers,

DJ

o Note that on 34 you have \psi but in Eq, (1) \Psi , that's what I meant to be unified

==========

5.2 Higher Order Harmonic Correlations
379 "entropy" => "entropy density"
done
379 broken reference
fixed

Fig. 5, caption: a) SC(m,n) => SC(m,n) ; b) See if you need to append "at collisions" after Pb-Pb;
done
383 share => shear
done
385 than => than for
done
386 first "," => “and"
done
386 Again, I would never start a sentence with "And", I think this is two colloquial style
done
387 "the other" => "the ones with other”
done
390 "As similarly" => “Similarly"
done
391 "to the data" => "to its signature in the data”
done
393 "didn't show" => "does not”
done
393 "or" => "nor to different" (I think)
done
393 "NSC(3,2)" => "it" (I think you are still referring here to NSC(4,3) mentioned in the 1st part of sentence)
that was for the reminder for v3-v2… it was confusing . i removed it
395 "from particle level" => "for final state particles from”
done

396 I think you can drop "to the data”
done
396 I buy this statement only for SC(5,3). If you take this comment into account, then the following sentence also needs to be modified
yes..The string melting AMPT model describes SC(5,3) and NSC(5,3) well. The same setting overestimates SC(5,2) and NSC(5,2).
398 "fairly well as similarly as" => see if you can rephrase this a bit, this construct doesn't read that well
However the default AMPT model can describe NSC(5,3) and NSC(5,2) fairly well as it is the case for NSC(3,2) and NSC(4,2) seen in Fig.~\ref{ig:Figure_4}.
400 "describes" => "describes well”
done
401 See if you want to replace "SC (NSC(m,n))" with "symmetric cumulants" (by this point the reader might have forgotten what SC stands for ;-))
done, yes more or less...
402 "correlation" => “correlations"
done
402 "(or very weak correlations)" => "(or predicts very weak correlation)" (or some other rephrasing)

done

==========

5.3 Transverse Momentum Dependence of Low Order Harmonic Correlations

Fig. 8, caption: SC(4,2) => NSC(4,2)
done
406,418,442 "mid central" => "mid-central”
done
409 See if you want to append at the end of the sentence “simultaneously”
done

413 I think it also fails in 5-10% and in 30-40%, but this might be subjective

let’s see what IRC can comment.

==========

6 Summary

o We need to reword it eventually a bit so that same sentences from short SC paper do not show up here again
good points.. I write it now like...
In summary, we have measured the Symmetric 2-harmonic 4-particle Cumulants (SC) to higher order Fourier harmonic (up to 5^{th} order) correlations as well as to $p_{\rm T}$ dependence of correlations for the lower order harmonics (v_3-v_2 and v_4-v_2).
We have found that fluctuations of v_2 and v_3 (v_3 and v_4) are anti-correlated in all centralities while fluctuations of v_2 and v_4 (v_2 and v_5, v_3 and v_5) are correlated for all centralities.
423 The => These
done

426 and => while
done
426 "(" => “(“
done.

431,439 condition => conditions
done
432 Drop "in the model”
done
438 See if you want to start a new sentence at point "and based”
done
441 "Finally" => "Finally,"
445 "properties" => "properties of nu

done
clear matter" (or something analogous)

done.

This was all from me, congratulations for a great work already now because paper is already in an excellent shape!

In my agenda I have the following two things:
1) SC vs. eta systematics for the analysis note;
2) expand 144-150 with the summary of few more theoretical papers which deal with SC.

That would be excellent!!!

It is unlikely I will have these two items accomplished before sending this version to IRC, so I vote to send the current version to IRC as soon as possible, and then I will provide these additions on the go.

It is also unlikely that in this week I will find more time for one more round of in-depth reading, as now I have to switch to other things prevailing in my agenda!

Congratulations again!

Cheers,
Ante
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Thanks a lot for your comments, i should have done better for the first version, anyhow we keep improving it over IRC review..

Cheers,

DongJo