Long Symmetric Cumulant paper : First IRC review

We would like to thank all IRC members for the prompt reviews on the paper draft as well as for many great suggestions. The replies to all IRC comments and an outline of the changes made in the updated version of the manuscript are provided below:

Paper draft location :

<https://aliceinfo.cern.ch/ArtSubmission/sites/aliceinfo.cern.ch.ArtSubmission/files/draft/djkim/2016-Nov-11-paper_draft-longSC_v3.2.pdf>

**Reviewer : Sudhir Raniwala**

Dear PC members, Dear Ilya,

Just a reiteration of two of the earlier comments.

(i) The suggestion of looking at SCs for different values of v\_n: I realise that SC can not be obtained event-by-event. However, considering that we have an event-by-event estimate of v\_n, we can divide the sample in classes of events with different values of v\_n. For each of these classes, one can obtain the SC, and hence determine how SC depend upon v\_n.

Yes,  your suggestion is indeed interesting and excellent one.

We would like to do it as soon as this paper is out.

Actually i had a discussion with Harri Niemi few weeks ago. This kind of analysis will be done for sure in the near future.

See the comments from Harri,

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Considering the pT-cut independence of the v\_2 fluctuations:(  Fig3 <https://arxiv.org/pdf/1205.5761v3.pdf> )

These are mainly coming from the eccentricity fluctuations in the initial state, and only in the tails (high values of v\_2),

one can see a clear non-linear response to the fluid dynamics. So in that sense its not completely

surprising that correlations and fluctuations have different behavior. Maybe if one would select

only high values of v2 and then look at v4 fluctuations within this selection the situation would

be different.

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(ii) The other (major) comment was: do the models used to compare data for SCs reproduce the v\_n distributions?  I think You had mentioned something about this. Please help me understand this again.

While we are preparing the plots with <vm^2><vn^2>, here i  was able to compile the <vn> model comparison plots. We think the validity of the models are well stated in the paper.

see the attachment.

**Reviwer : Alice Ohlson**

Two general suggestions/comments:

- Like I wrote in my previous comments, be very careful about stating

that a value is increasing when it's actually getting more negative

(i.e. decreasing!) or about saying that something more negative is

"larger" than something less negative.  The strength of the

anticorrelation may be increasing (larger), but the actual numerical

values are decreasing (smaller).  I notice this in line 229 but I think

it happens elsewhere too.

R : We changed to “Both NSC(3,2) and NSC(4,3) are getting more anticorrelated toward peripheral collisions with the similar magnitude.”

And remove ‘and a monotonic increase is observed” in line 227.

- I suggest defining a quantity p\_T^{min} at line 231 so that you can

then use it throughout this paragraph were applicable. For example, in

line 234 you can write 0.2 < pTmin < 0.7 to be more clear.  Also you can

change the legends in Fig. 2 to say e.g. pTmin = 0.8 GeV/c instead of

0.8 < pt < 5 GeV/c (this will reduce the text on the figure).

R : good suggestion, we modified the text and figures accordingly.

* line 81: magnitude -> magnitudes
* R : done
* line 82: is sensitive -> are sensitive
* R : done
* line 109: alone are -> alone is
* R : done
* line 116: of heavy-ion -> of the heavy-ion
* R : done
* line 149 (and perhaps elsewhere): pseudo-rapidity -> pseudorapidity
* R : done, only here
* line 153: taken for -> included in
* R : done
* line 192: correct for -> avoid
* R : done

- lines 193-194: I suggest "resolution, a hybrid track selection

utilizing SPD hits and/or ITS refit tracks combined with TPC information

was used."

R : done

* line 195: The systematic -> A systematic
* R : done
* line 199: and it is -> and is
* R : done
* Fig. 1 caption: Systematical -> Systematic
* R : done
* line 241: NSC(m,n) -> NSC(4,2)
* R : done

- lines 260 and 315 (and perhaps elsewhere): initial condition ->

initial conditions

R : done and found one more place, fixed now.

* line 305: remove "observable"
* R : done
* line 308: to model the initial stages -> in models
* R : done
* line 309: use -> measurement
* R : done
* line 310: The better -> Better
* R : done

- Figs. 3, 4, and 5 need a bit more work on the plotting, some ticks

labels are cut off, points cover up 10^-6, the exponents along the axis

change, and parm->param in the legends.  Also, all the text needs to be

made larger.

R : parm->param fixed, we have improved the figures as you said.

* line 355: As it can -> As can
* R : done
* line 355: for "param1" -> for the "param1"
* R : done
* line 355: latex ''->``
* R : done

- line 356: from the hadronic to the QGP phase occurs at the lowest

temperature, around 150 MeV

R : done

- line 357: characterized by a moderate slope in eta/s(T) which

decreases (increases) in the hadronic

R : done

* line 358: with the parameters for -> in
* R : done
* line 358: of phase -> of the phase

R : done

* line 359: latex ``->''

R : done

* line 359: already with -> by
* R : done
* line 359: measurement -> measurements
* R : done
* line 361: remove "the transition towards"
* R : done
* line 363: the data -> the anticorrelation in the data
* R : done
* line 364: a failure of constant -> the failure of a constant
* R : done
* line 370: quite clear -> clear
* R : done
* line 386: Except for the
* R : done
* line 392: a AMPT -> an AMPT
* R : done
* line 412: "for NSC(3,2) there is no pt dependence in the centrality"
* R : done
* line 413: seen for -> observed in
* R : done
* line 414: or the centrality increase -> or centrality increases
* R : done
* lines 415 and 417: Fig. 8 and Fig. 9 -> Figs. 8 and 9
* R : done
* Figs. 8 and 9 captions: cut -> cuts, are ->is
* R : done
* line 420: magnitude of the data for both -> magnitudes of both
* R : done
* line 425: remove "from the data"
* R : done
* line 430: In case -> In the case
* R : done
* line 434: with two -> with the two
* R : done
* line 435: parameterizations -> parameterizations of eta/s(T)
* R : done
* line 435: magnitude -> result
* R : done
* line 436: centralities -> centrality range
* R : done
* line 436: underestimate in -> underestimate it in
* R : done
* line 436: add comma after "However"
* R : done
* lines 437-438: calculations between -> results for the
* R : done
* lines 438-439: between two parameterizations are -> between the two are
* R : done
* line 439: in 10-20% where -> in the 10-20% centrality range where
* R : done
* line 445: correlation -> correlations
* R : done
* line 448: the non-flow -> non-flow
* R : done
* line 449: free from -> independent of
* R : done

- The sentences at liens 466-467 and 470-472 say almost the same thing,

so I suggest incorporating the first one into the second.

R : done