Thank you very much for your thorough review of our work. I greatly appreciate the time you took to complete this. I apologize for the delay in addressing these comments, and thank you for your patience. I will submit, together with the new draft, a document highlighting the changes made to the text. Much effort was also spent in cleaning up the figures, but these changes are not included in that document. Please contact me or Tom if you have any questions or additional comments. Thanks again.

Cheers,
Jesse

WUT review of "ΛK femtoscopy in Pb–Pb collisions" paper

Link to paper page:
https://alice-publications.web.cern.ch/node/5115

Link to paper draft:
https://alice-publications.web.cern.ch/system/files/draft/5115/2019-08-28-lamkpublication_v6.pdf

Comment authors:
Łukasz Graczykowski
Georgy Kornakov
Janusz Oleniacz
Daniel Kikoła
Małgorzata Janik

GENERAL

~~Use upfonts for particles \uppi from upgreek package.~~
~~Unify the k*, **k**, **P**, **p**, p.. (vectors and scalars notations, 3-momentum, 4-momentum)~~
~~Unify Fig. Figure Ref. Reference Eq. Equation and so on.~~
~~Check for repetitions. The information is several times repeated in the text in neighbouring paragraphs and sentences.~~

Asymmetry measurement this part of the analysis is very inconclusive and doesn't provide further insight for the reader. It is not clear if the simulation with a different radii would describe better the data, or by changing the interaction parameters. It seems that both are correlated (R and f). The fact that the mT scaling is not followed by the non-identical is expected, but to produce an expected value is not an easy task in the presence of collective motion, as here, for example residual correlations do play a role as they may contribute with a non-flat distribution, as heavier particles will have more flow.

I agree with Georgy here. For the moment the paper focuses on both aspects: the strong interaction measurement, and then the emission asymmetry. In my opinion, the procedure should be the following: we first constrain the parameters, then we use them to extract the asymmetry. Here, after reading the paper, I have an impression that the asymmetry measurement and the whole analysis is incomplete. While this is good for a PhD thesis, personally I would not keep it in this paper. Perhaps a better option would be to use what is in the Appendix C as a basis for a future theoretical/methodological paper, and then just use the developed method while analyzing data in a subsequent ALICE paper.

In addition, here it is assumed that all three radii of LCMS have the same value, but this also may not be true. We know from identical pion measurements for instance, that they are not the same. This was taken into account in the pion-kaon analysis for example. In summary, I think the paper would benefit more if it had a clear message and really finalized results - so focus on scattering parameters which is very well done, and remove the asymmetry part.
Method from Appendix A is also not used in the final analysis (at least to our understanding), consider removing it.

This appendix is not meant to be conclusive, but is meant to help explain and better understand why the LamK results do not align on the mT scaling plot. Without such an appendix, we are simply making claims without any evidence to support it. For this reason, this appendix is a necessary part of the paper.

MINOR GENERAL

~~Provide equations in parenthesis, like Eq. (10) (mixed ways are used, sometimes with, sometines without)~~

FIGURES

~~For almost all figures labels are very small. They are readable only on screen (with zoom) and not on printouts. Please try to increase the labels as much as possible.~~
~~Fig. 1 : almost all labels unreadable (axis, legend, Sig/Bkg)~~
~~Fig. 2. Legends~~
~~Fig. 3. Legends, axis labels~~
~~FIg. 4 Axis labels, legend~~
~~Fig. 5. Axis labels~~
~~Fig. 6. Axis labels~~

TITLE

ABSTRACT

~~The abstract should be modified if the asymmetry measurement stays or it is removed from the publication.~~
We do not claim to have made an asymmetry measurement. However, an understanding that non-identical femtoscopy, with its separation of single particle sources, is different from identical particle studies is essential in understanding our analysis.

INTRODUCTION

~~L24: In addition to a review paper [1] (by Lisa, Wiedemann, et al) I would also add references to femtoscopy such as Kopylov and Podgoretsky papers.~~

~~L26-27: CF are sensitive to FSI and to the source~~
I believe this is well established by the preceding two sentences, and not necessary to restate.

~~L31-32 "The momentum and species..." should be before the non-identical femto as it relates to the general and not only to non-identical.~~

~~L33 unique environment? Femtoscopy allows one to measure/access/extract…~~

~~L33: "in which to measure scattering parameters, many of which are difficult (...), to measure othweise" -> very hard to understand, please rephrase~~

L34 nuclear scattering parameters? Which and what they are.
I don't understand the question. Please clarify.

~~L35 "This aspect of femtoscopy is the focal point...." This sentence is superfluous, should be clear from introduction and abstract.~~

~~L33: repetition of "analysis" just next to each other~~

~~L35-37 "In this analysis, L-K pairs are studied, in which at least one particle is electrically neutral. Quantum statistics and the Coulomb interaction do not contribute, offering a clear signal from the strong interaction." L-K pairs, which only interact strongly, are the subject of this analysis~~

~~L42 "This study is particularly interesting": This sentence is superfluous, Don't say it, you have to convince readers about it.~~

~~L42-43: "where not previously not known" ?~~
~~where not previously known~~
~~where previously unknown~~

~~L42-43 Or they are unknown (the parameters) or there is limited knowledge about them. Can not be both simultaneously.~~
Until the parameters are measured experimentally, they are not known. Whether or not there exists theoretical predictions does not change this.

~~L30: separation of the single particle source emitting regions -> separation of the single-particle source regions; or: "single-particle emission regions" (although I'm not a native speaker)~~

~~L44: Scattering parameters for similar systems are also very limited -> it should be rather "information about scattering parameters for similar systems is also very limited"~~

~~L47-48 "This paper presents the first measurements of the scattering parameters of LK pairs in all three charge combinations (LK+, LK-, and LK0S)." Repeats sentence from lines L39-40.~~
L39-40 = "The ΛK analysis presented offers low energy QCD measurements, which fall into the non-perturbative regime of QCD." Do you mean a different line number?

~~L52 Which are the non-femtoscopic backgrounds? In the paper only flow is studied.~~

I'm not sure I follow the question. The elliptic flow is the main contributor to the non-femtoscopic background. The flow generated in the THERMINATOR 2 simulation is used to study and model the contribution.

~~L53 "correlations induced by feed-down from resonances". This leads to confusion as you correct for electromagnetic and weak decays, which are long lived particles wrt the time of formation of the femtoscopic signal and drop the short lived resonances. Specify it.~~
Good point. I guess to be completely correct, I would have to state "strong, weak, and electromagnetic decays", which is a mouthful. Therefore, I have everywhere replaced "resonances", "resonance decays", etc. with "particle decays"

L60 Appendix A is not used for anything in the text. Yes, a method exists to suppress the effect from flow but it also doesn't produce a full decorrelated background in the femtoscopic region. It is a good proof of principle that the non-flat CF comes from flow. Moreover it works for central and semi-central but is not flat in peripheral, meaning that other sources are present.
I agree, it supplies good evidence that the background is the result of elliptic flow. Also, I am unaware of any other publication which demonstrates the background flattening effect of this procedure. When I first presented these results to the AliFemto group, most were unfamiliar with the effects of the procedure as well. It is important to test and develop new methods which will allow us the most precise extraction of femtoscopic properties. It is impossible to understand the impact of a different procedure without testing, optimizing, and evaluating such a procedure. For this reason, it seems useful to document the background flattening effect of this method, to add to the knowledge bank, so those in future studies may pursue this direction more thoroughly.

L63-64 Appendix C and THERMINATOR. The source offset has only limited effect on the radii. See paper A. Kisiel, "Pion-kaon femtoscopy in Pb–Pb collisions at √sNN=2.76 TeV modeled in(3+1)D hydrodynamics coupled to Therminator 2 and the effect of delayed kaon emission," arXiv:1804.06781
For a pion-kaon system the source offset it not as great, as the mT values for the two systems are much more similar than in a LamK analysis. Therefore, one would expect the effect to be more pronounced in the LamK system.

The part related to the delayed emission is not conclusive. It is not clear at all if the effect comes just from collectivity or there is something on top as an offset. Moreover the different parameters seem to correlate and instead of mu_out one could change slightly scattering parameters and get a similar result.
I do not believe on may account for a relative shift in emission by slightly changing the scattering parameters. Certainly, one cannot reproduce a RC_11 signal by doing such. This appendix is not meant to be conclusive, but it meant to help explain and better understand why the LamK results do not align on the mT scaling plot. Without such an appendix, we are simply making claims without any evidence to support it. For this reason, this appendix is a necessary part of the paper.

~~L64: the source offset in the "out" direction -> this is jargon; since it is an introduction, why not write what the "out" is?~~

DATA ANALYSIS

~~L69-70 “This work reports on the analysis of Pb–Pb collisions at sNN = 2.76 TeV produced by the LHC and 70 measured by the ALICE experiment [16] in 2011.” Was already said several times before.~~
It seems appropriate to state the dataset used in the beginning of the Data analysis section. We will keep this sentence.

~~L77: Tracking System -> Tracking System (ITS) ; to be consistent with the previous line.~~

~~L77-78 determining and determination too close to each other. Substitute by a synonym one of them.~~

~~L79 of the **tracks** was performed using **tracks**~~
~~“The determination of the momenta of the tracks was performed using tracks reconstructed with the TPC only” -> The momentum was reconstructed by the tracking algorithm using only TPC clusters.~~

~~L79-81 Reorder. In order to achieve high quality you impose minimum number of clusters cut.~~

~~L79: A minimum requirement of 80 reconstructed TPC clusters was imposed -> I would add here “requirement of 80 reconstructed TPC out of ... possible was imposed”~~
I have not seen this number quoted in other publications, and do not feel its inclusion is vital.

~~L81 “remove fakes” -> reject~~

~~L85 Bethe-Bloch depends also on charge!~~
Yes, of course. The charge is implied as it is an intrinsic property of the particle under consideration. As such, it seems redundant to state explicitly.

~~L88 repeated -> tested/applied. Why also to electrons?~~
Repeated changed to applied.
The established analysis code generates results for these four particle species hypotheses by default.

L89 ~~hyphens “-”, especially followed by “,” do not look good.~~
~~Regarding the PID nsigma section, say explicitly that it was used to select primary kaons, as well as for acceptance and rejection of V0 (lambda) daughters. Because finally you have a primary kaon sample (where you select kaons and reject electrons and pions) as well as pions and protons of lambdas (where you have acceptance criteria). How it is written now suggests the reader that you actually select all 4 species (electrons, pions, kaons, protons) as primary particles - at least that was my impression.~~
~~Perhaps describe the general idea of nsigma for a given example particle instead (that nsigma is deviation in number of sigmas from the mean of the distribution for a given particle)…~~
~~Anyhow, I would think of rewriting parts of this paragraph.~~

~~L106 2.2 V0 selection -> K0 and Lambda selection~~

~~L107-108 Mention the branching ratios of these decays.~~

~~L108 The main selection -> remove “main”, is there any other?~~
Yes, there are the misidentification procedures described below. In any case, “main” has been removed.

~~L 109 “Aside from typical kinematic” -> remove typical~~

~~Table 1, Electron rejection: In the definition of the condition for electron rejection, charge is unnecessary (“e^-” should be “e”, $K^{+/-}$ should be K, I think)~~

~~L114-115 “The positive and negative daughter tracks are combined to form the V0 candidate, the momentum of which is the sum of the momenta of the daughters (calculated at the DCA).” Move to L108 after “The obtained candidates are...”. Is momentum calculated at the DCA or at the Point of Closest Approach?~~
The DCA between the daughters is the point of closest approach. Clarified now in text.
This cannot be moved to after L108, as the DCA V0 daughters has not yet been defined.

~~Line 114: why “Daughters” has to start with capital “D”?~~

~~L120-135 Simplify this paragraph, something like: Each V0 L is tested for the K0 hypothesis by identifying both tracks as pions. In the event that the second hypothesis provides a good K0 mass, both tracks pass well single particle cuts, and the difference of the reconstructed invariant mass to the PDG value is smaller than that of the Lambda, then this V0 is rejected.~~
Simplifying as such makes the text unclear and difficult to follow. Text kept as is.

~~L143 “For the purity **estimations**, the background signal is **estimated**” ->~~
~~For the purity estimations, the background is obtained from/calculated/extracted~~

~~L144-145: fitting the minv distribution outside of the mass peak and assuming the distribution to continue smoothly within the mass peak -> I would add here what is the assumed shape (linear?)~~

~~L145 *within* peak -> beneath~~

~~Fig. 1: I would add in the caption what is the centrality class for these data (0-50%?)~~

~~Fig. 1: “Bkg” and “Bgd” used, perhaps unify, also do we need to provide separately “Sig” and “Sig+Bkg” (which are big numbers and depend also on number of analyzed events, finished jobs on the grid etc.)? Would one number for purity (the division of those two) instead work? That would be more valuable I think~~

~~L148 “due to pairs sharing daughters” Already said in L138-139~~
In L138-139, the daughter sharing is between particles of the same type within a single particle collection, e.g. making sure all Lambdas from a given event have unique daughter. The daughter sharing in L148 refers to sharing of daughters between particles in a pair, e.g. a Lambda and K0s sharing a pion daughter.

~~L149 “split or merged tracks” What they are? Substitute by their definition.~~

~~L150 “The purpose of the shared daughter restriction is to ensure the first particle in the pair is unique from the second.” Drop the sentence, it is clear.~~
This is different from the daughter sharing described in the previous section, so I think this extra clarification is worthwhile to keep.

~~L162-164 “The constraint values used coincide with the values at which the average separation correlation functions stabilize to unity, signifying the splitting and merging effects are no longer abundant.” Simplify; The cut value was chosen by varying it until no effect was visible in the correlation function.~~
This sentence has been removed, as it is not vital. In order to include the sentence, we would need to also explain what a average separation correlation function is, which would seem to add confusion without gaining much understanding.

ANALYSIS METHODS

~~3.5 Non-femtoscopic background: Was THERMINATOR-2 simulation filtered with acceptance-efficiency from experiment in order to reproduce better the experimental distributions?~~
No. The experimental distributions reproduced well enough for our purposes.

~~L176-179 Check for scalars and vectors. Unify notation. Define the asterisk.~~

~~L179-180 “Within the Psi2 term the particle interaction information is contained, and therefore the scattering parameters.” Not needed, delete the sentence.~~

~~L180 - perhaps move section 3.2 here (continue with description of Psi using Lednicky model) as this is connected. The next section is then the experimental measurement, which is something separate from theoretical approach (for example Eq. (3) is an experimental solution to Eq. (1))~~
Sentence removed.

~~L184: femtoscopic effects -> should be rather “physical effects”, since the correlation function contains non-femtoscopic background, as indicated later in the paper.~~

~~L184 femtoscopic effects -> correlations~~
Femtoscopic effects → physical effects, as per the previous comment.

~~L186 “Typically, B(k) is obtained using mixed-event pairs [28]” ->B(k) is obtained using the mixed-event technique [28]~~

~~L187-189 The rotation by 180 is not used, why mentioning it at all?~~

~~L189 “For this analysis, the typical mixed-event method” -> For this analysis each event is mixed with five…~~

~~L 190-191: “events” appears many times, like “... events, only events ...” -> rephrase~~

~~L 192 are mixed -> are used.~~

~~L193 -196 “This analysis presents correlation functions for three centrality percentile ranges (0–10%, 10–30%, and 30–50%), and is pair transverse momentum (kT = 1/2 |pT1 +pT2|)~~

~~integrated (i.e., no restriction on kT) due to limited data. The kT dependences of the three LK charge combinations should be comparable, so an integrated analysis is acceptable." ->~~
~~This analysis presents correlation functions for three centrality percentile ranges (0–10%, 10–30%, and 30–50%).~~
I was specifically directed in previous rounds to add the sentences you suggest removing, so I will keep them.

~~L195: "The kT dependences of the three LK charge combinations should be comparable, so an integrated analysis is acceptable." I would remove this sentence or rephrase it. Since we don't know if the kT dependences of the three LK charge combinations are comparable, we can't conclude about whether "analysis is acceptable" or not.~~
I was specifically directed in previous rounds to add this sentence.

~~L196-197 "The correlation functions were constructed separately for the two different field polarities applied by the ALICE L3 solenoid magnet during the data acquisition. " ->~~
~~The correlation functions were constructed separately for the two different field polarities with *similar statistics in each data sample*.~~
I do not understand why this should be added. The - - configuration has > 1.5 times the events of the + + configuration. Please explain why these extra words are necessary.

~~L197-199 "These are kept separate during the fitting process, and are combined using a weighted average when plotting, where the weight is the number of numerator pairs in the normalization range." This applies to the CF or to the results of the extracted parameters from the fit? Those have likely different errors. Only in plotting or also for the tables?~~
Only for plotting. There is no need to combine the data during the fitting process, as all systems were fit simultaneously. The results were combined for plotting to reduce the number of plots needing to be presented.

~~L210 "with at least one uncharged member" was already said before (L201), drop it.~~

~~L. 212: provide a reference to Lednicky & Lyuboshitz paper from 1981 regarding the F1 and F2 functions (they are introduced there)~~

~~L218-227. Primaries and secondary particles should be defined before, better in the introduction when introducing residual correlations and feed-downs. Lifetime of the particles is not mentioned.~~

~~L236 Lfit parameter, for what is needed? Then is compatible with 1. For what it accounts for?~~
This essentially allows for the proportions of "Others"+"Fakes" vs "Primary"+"Residuals" to differ from those found by THERMINATOR. The results favor Lfit values close to one, signifying the simulation does a good job. Of course, the Lfit parameter does have some restrictions on values it can assume. Basically, Lfit*(lambda_Primary + lambda_Sig0K + lambda_Xi0K + lambda_XichK) should never be greater than one.

~~L232-233 Within the list phi meson in not there. 10% of K+K- are from phi's. It's lifetime is of 40 fm/c, so it should be somewhere mentioned.~~
The phi does not contribute significantly to this analysis. These are grouped in the "Other" category.

~~L289-294 Simplify the fakes part: e.g. Fakes fractions are obtained from the product of~~

~~individual particle purities.~~

~~L296-299 “Finite track momentum resolution causes the reconstructed momentum of a particle to smear around the true value. This, of course, also holds true for V0 particles. The effect is propagated up to the pairs of interest, which causes the reconstructed relative momentum (kRec) to differ from the true momentum (kTrue). The effects of finite momentum resolution are accounted” ->~~
~~Finite track momentum resolution causes the reconstructed relative momentum (kRec) to differ from the true momentum (kTrue). It is accounted….~~

~~L. 297: I am not sure we can say “V0 particle” which sound like a slang, however you defined it in L108. Then it’s fine, but would it be possible to rephrase this to avoid the “V0 particle”?~~

~~L304-306. From “Equation 10 describes that...” and until the end of the paragraph is not needed.~~

~~Table 5 Why all the Fakes fractions are identical even though the purity for charged K and K0 are different.~~
The table included was dated, and did not include reconstruction efficiencies. However, the 97% purity for the Kch and 98% purity for the K0s are nearly identical, and did not result in different values to three significant figures. The current values do differ, as the reconstruction efficiencies for these two are different enough.

~~L307 Non-femtoscopic correlations~~
We prefer non-femtoscopic background

~~L313-315 Drop the last sentence of the paragraph.~~
This sentence motivates why the simulation is needed, and is therefore kept.

~~L331-332: “during the fit of the low-k* signal region, the background is fixed” - this part was a bit confusing for me.The first part of the sentence is about fitting the background model to data, but then there is a statement that “the background is fixed” in the “fit”. What is the “fit” in this case then? Is it a fit of the experimental data with model of a full correlation function, with fixed background?~~
I reworded things slightly.
The background is fixed when the signal region is fit, where the source size and scattering parameters are extracted.

L334-340 This is not used. Drop it.
See previous response.

L334-340: agree - as I understand, this is not used in the final analysis (at least to my understanding from the text). Good for a PhD thesis to have this check, but here not needed and provides a bit of confusion. Since you have it here, why wasn’t it used for systematics then? In such a case that would be justified to have this part in the paper.
~~Minor comments regarding this paragraph: “appendix” is not specified (you should say “Appendix A”). Sentence “is to instead attempt to eliminate it” doesn't sound good to me. “Thebackground MAY be effectively” -> perhaps change “may be” to “can be”? “may be” sounds to me like “may or may not”, very weak statement. You also have “Stavinsky method” next to each~~

~~other in the same line (336)~~

~~L352-357 Starting from "For each pair system" until the end of the paragraph is repeated in the next paragraph. Remove it.~~

~~L357 "To summarize, the complete fit function" -> The fit function...~~
~~(It is already a subsection called summary)~~

~~L367 "and has been corrected for momentum resolution..." Already mentioned before in L364~~

L370 What is the effect of the variations done for the systematic study? Put it to the table 6.
This would be very difficult to fit compactly into a single table, and probably not worth the added space or confusion. We have decided to remove the table. The effect of the variations can be seen as the systematic uncertainties on the data points of the correlation functions.

L373-374 The standard deviation is not the best estimator of the uncertainty. In the event of an infinite number of variations with very small steps, you would get 0 error.
I do not really follow what is your argument here. If you have an infinite number of very small variations, then you're not really varying anything at all. What is your suggestion?

~~L374: I think I didn't get the procedure. You say "the correlation functions from each variation of the selection criteria were averaged". So let's say you have: default -> functionDef, variation1 -> function1, variation2 -> function2, ..., variationN -> functionN. This gives you, for each k*, a distribution of values. From this you calculate the average and the standard deviation. But what standard deviation do you calculate? *standard deviation of the average* (error of the mean) or *standard deviation of the distribution of N points* (sqrt of the second moment of the distribution)? If the former one, this is for sure not correct, and would give you 0 if N->infinity. Also, how do you calculate average? Is this a simple average or a weighted average?~~
~~Anyway, this is very unclear.~~
I calculate the standard deviation of the distribution of N points, using a simple (not weighted) procedure. I tried to re-word things a bit with your clarifying question in mind.

~~L376-378 What is the correlation between the fit parameters?~~
See attached figure at end of document.

L380-385 What is the effect of all these changes on the results? Also for Table 6.
The main contributors to the systematic errors on the extracted parameter sets are the fit methods (i.e. the k* fit range, modeling of the non-femtoscopic background, and the treatment of the residuals). A sentence has been added stating this point, and the table has been removed from the text.

RESULTS

~~L390-394 "but assumed unique among the different LK charge combinations (i.e., a parameter set describing the LK+ & LK- system, a second set describing the LK- & LK+ system, and a third for the LK0S & LK0S system). Each correlation function receives a unique normalization parameter. The fits are corrected for finite momentum resolution effects, non-femtoscopic backgrounds, and residual correlations resulting from the feed-down from resonances."~~

~~-> Already said in the previous section. Belongs to method. Drop it.~~

~~L393: The fits are corrected for finite momentum resolution effects... -> I would say "The fits (or fit functions) include finite momentum resolution effects...".~~
Sentence dropped, as per previous comment.

~~L398-400 Why primary contribution is different for different centralities?~~
~~The difference due to the non-femtoscopic background should be properly captured by THERMINATOR.~~
I do not understand the question, please clarify. Different centralities have different sizes, so the correlation functions will be different. The extent of the non-femtoscopic background contribution is also different for the different centralities.

~~L407-408 "The real part of the scattering length describes the effect of the strong interaction, making the difference in these systems quite intriguing."~~
~~Remove it. Should be decided by the reader.~~

~~L415 "which is clearly inconsistent with the LK+ system" Considering the errors (specially from [11] this is a too strong statement.~~

~~L443: "smaller homogeneity regions", I would explain what a "homogeneity region" is, so far only "source" was used to describe a region from which particles are emitted.~~
Sentence added to preceding paragraph introducing regions of homogeneity.

~~Fig. 4, Tab. 6 and related text - I'm confused by the meaning of "lambda_{Fit}" parameter.~~
~~If I understand correctly the Eq. 6 (page 9), lambda_{Fit} is introduced to account for residual correlations. Then, the parameter "lambda_{LambdaK}" is related to the studied correlations of LambdaK system. Why then present "lambda_{Fit}" instead of "lambda_{LambdaK}" as one of the main results of the paper?~~
lambda_fit allows for the proportions of "Others"+"Fakes" vs "Primary"+"Residuals" to differ from those found by THERMINATOR (see response to comment at L236).
lambda_Fit is extracted by the fit, lambda_LambdaK is set by the THERMINATOR 2 simulation. The product of the two, lambda_Fit*lambda_LambdaK, is related to the studied correlation of the LambdaK system.

~~Fig. 4 d0 is not commented at all in the text.~~
Sentence added.

~~L460 and until the end. C00 is identical to the normal analysis for radii. C11 of fig. 6 is not corrected for background. The non-identical radii can not be easily obtained from the single particle radii. Moreover, the mean <m_T> of the particles is not fully correct, as at k*=0, the slowest kaons will be balanced by the fast lambdas. Therefore the relevant m_T is os kaons of those which contribute to the low k* region! This part is very non trivial.~~
For non-identical pairs, I do not think C00 is identical to the normal 1-dimensional correlation function, but is very similar. Although I am not certain, and have changed the wording.
I'm not sure what your comment or suggestion is here? I understand that the non-identical radii are not easily obtained from the single particle radii. At no point do we state that we can somehow simply extract the radii and offsets. Hopefully with this measurement supplying the scattering parameters and

radii within the simple Lednicky model, in the future an extraction of the separation and single particle source sizes can be achieved.

~~Fig. 5 Why <m_T> changes with centrality for LK by ~50 MeV/c2?~~
Because the collision system, and therefore the kinematic distribution of the particles, is changing while the cuts remain the same.

SUMMARY

~~L483-484 "The non-femtoscopic background is found to result almost entirely from collective effects" Where any other tested?~~
I do not understand the question, please clarify. Were any other what tested? The simulation clearly shows the the leading contributor is the anisotropic flow.
~~"and is described quantitatively with unprecedented precision with" in 30-50% centrality there are systematics. Soften it.~~

~~L485-488 "Finally, the LK systems exhibit source radii larger than expected from extrapolation from identical particle femtoscopic studies. This effect is interpreted as resulting from the separation in space–time of the single-particle L and K source distributions (i.e., the emission asymmetry of the source)."~~
~~It is not easy to have non-identical radii from identical. What were the expected values?~~
Right. One cannot come up with expected values without knowing the space-time separation between the single particle sources. Even with such knowledge, determining the appropriate radius within the Lednicky model is non-trivial. The point is basically that non-identical results should not even be placed on the same figure with identical particle studies.

The expected values, for someone naively looking at the figure, would align with the mT scaling trend. This is a major reason why we need to clarify that we don't expect the result to align with the identical particle data. For those with a bit more knowledge, a slightly better estimate can be devised by assuming the offset to be zero. In such a case of mu_out = 0, one may estimate the single particle Lambda radius and Kaon radius from the identical particle studies on the plot. For example, for a 0-10% centrality study, using the appropriate mT values (mT~ 1 GeV for K, mT~2 GeV for Lam), one would expect the single particle Kaon source to be R_K ~ 5/sqrt(2) and the Lambda radius to be R_L ~ 3/sqrt(2) (reading values off of the mT scaling plot). The sqrt(2) comes from the fact that we are obtaining the single particle radii from the identical two-particle results. Then, assuming zero offset of the sources, one could estimate R_LK^2 = R_L^2 + R_K^2 ~ 4 fm. The results we obtain are clearly larger than 4fm, and therefore this simplified situation of zero offset is not valid.

BIBLIOGRAPHY

~~Inspirehep bug, name of the journal attached as number (in bold) *Phys. Rev. C **78*** (references 3, 6, 7, 8, 9, 10, 11, 13, 14, 17, 19, 20, 24, 27, 28, 29, 30, 33, 34, 35, 37, 39)~~

~~Please be consistent with the number of letters in the names of authors, e.g. B. Abelev in [19] and B. B. Abelev in [20].~~

	λ (0-10)	λ (10-30)	λ (30-50)	R (0-10)	R (10-30)	R (30-50)	$\mathrm{Re}[f_0]$ ΛK^+	$\mathrm{Re}[f_0]$ ΛK^-	$\mathrm{Re}[f_0]$ ΛK^0_s	$\mathrm{Im}[f_0]$ ΛK^+	$\mathrm{Im}[f_0]$ ΛK^-	$\mathrm{Im}[f_0]$ ΛK^0_s	d_0 ΛK^+	d_0 ΛK^-	d_0 ΛK^0_s
λ (0-10)	1	0.733	0.639	0.799	0.526	0.398	0.769	-0.1	0.251	0.081	-0.514	-0.237	-0.371	-0.429	-0.036
λ (10-30)	0.733	1	0.566	0.488	0.743	0.28	0.711	-0.187	0.113	-0.048	-0.534	-0.334	-0.349	-0.428	-0.049
λ (30-50)	0.639	0.566	1	0.448	0.36	0.76	0.607	-0.129	0.203	-0.009	-0.434	-0.216	-0.293	-0.348	0.014
R (0-10)	0.799	0.488	0.448	1	0.722	0.621	0.446	0.48	0.582	0.635	0.078	0.333	-0.112	0.04	-0.079
R (10-30)	0.526	0.743	0.36	0.722	1	0.536	0.352	0.461	0.479	0.568	0.12	0.297	-0.045	0.088	-0.103
R (30-50)	0.398	0.28	0.76	0.621	0.536	1	0.219	0.466	0.529	0.542	0.193	0.375	0.025	0.149	-0.033
$\mathrm{Re}[f_0]$ ΛK^+	0.769	0.711	0.607	0.446	0.352	0.219	1	-0.332	0.034	-0.059	-0.636	-0.431	-0.58	-0.515	-0.005
$\mathrm{Re}[f_0]$ ΛK^-	-0.1	-0.187	-0.129	0.48	0.461	0.466	-0.332	1	0.573	0.881	0.871	0.834	0.329	0.764	-0.078
$\mathrm{Re}[f_0]$ ΛK^0_s	0.251	0.113	0.203	0.582	0.479	0.529	0.034	0.573	1	0.63	0.382	0.727	0.098	0.294	0.2
$\mathrm{Im}[f_0]$ ΛK^+	0.081	-0.048	-0.009	0.635	0.568	0.542	-0.059	0.881	0.63	1	0.727	0.805	0.098	0.567	-0.085
$\mathrm{Im}[f_0]$ ΛK^-	-0.514	-0.534	-0.434	0.078	0.12	0.193	-0.636	0.871	0.382	0.727	1	0.831	0.451	0.88	-0.05
$\mathrm{Im}[f_0]$ ΛK^0_s	-0.237	-0.334	-0.216	0.333	0.297	0.375	-0.431	0.834	0.727	0.805	0.831	1	0.362	0.656	0.214
d_0 ΛK^+	-0.371	-0.349	-0.293	-0.112	-0.045	0.025	-0.58	0.329	0.098	0.098	0.451	0.362	1	0.361	-0.017
d_0 ΛK^-	-0.429	-0.428	-0.348	0.04	0.088	0.149	-0.515	0.764	0.294	0.567	0.88	0.656	0.361	1	-0.038
d_0 ΛK^0_s	-0.036	-0.049	0.014	-0.079	-0.103	-0.033	-0.005	-0.078	0.2	-0.085	-0.05	0.214	-0.017	-0.038	1

	λ (0-10)	λ (10-30)	λ (30-50)	R (0-10)	R (10-30)	R (30-50)	$Re[f_0]$ ΛK+	$Re[f_0]$ ΛK-	$Re[f_0]$ $ΛK^0_s$	$Im[f_0]$ ΛK+	$Im[f_0]$ ΛK-	$Im[f_0]$ $ΛK^0_s$	d_0 ΛK+	d_0 ΛK-	d_0 $ΛK^0_s$
λ (0-10)	1														
λ (10-30)	0.733	1													
λ (30-50)	0.639	0.566	1												
R (0-10)	0.799	0.488	0.448	1											
R (10-30)	0.526	0.743	0.36	0.722	1										
R (30-50)	0.398	0.28	0.76	0.621	0.536	1									
$Re[f_0]$ ΛK+	0.769	0.711	0.607	0.446	0.352	0.219	1								
$Re[f_0]$ ΛK-	-0.1	-0.187	-0.129	0.48	0.461	0.466	-0.332	1							
$Re[f_0]$ $ΛK^0_s$	0.251	0.113	0.203	0.582	0.479	0.529	0.034	0.573	1						
$Im[f_0]$ ΛK+	0.081	-0.048	-0.009	0.635	0.568	0.542	-0.059	0.881	0.63	1					
$Im[f_0]$ ΛK-	-0.514	-0.534	-0.434	0.078	0.12	0.193	-0.636	0.871	0.382	0.727	1				
$Im[f_0]$ $ΛK^0_s$	-0.237	-0.334	-0.216	0.333	0.297	0.375	-0.431	0.834	0.727	0.805	0.831	1			
d_0 ΛK+	-0.371	-0.349	-0.293	-0.112	-0.045	0.025	-0.58	0.329	0.098	0.098	0.451	0.362	1		
d_0 ΛK-	-0.429	-0.428	-0.348	0.04	0.088	0.149	-0.515	0.764	0.294	0.567	0.88	0.656	0.361	1	
d_0 $ΛK^0_s$	-0.036	-0.049	0.014	-0.079	-0.103	-0.033	-0.005	-0.078	0.2	-0.085	-0.05	0.214	-0.017	-0.038	1