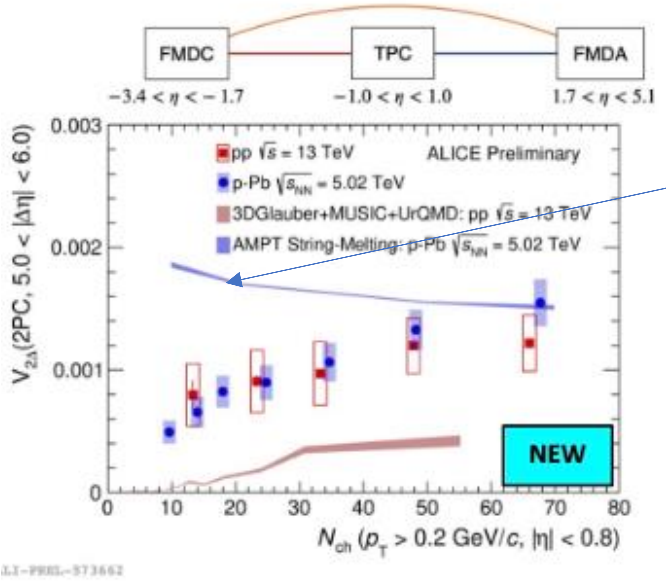
One page summary about the current status

IS2023 Debojit talk



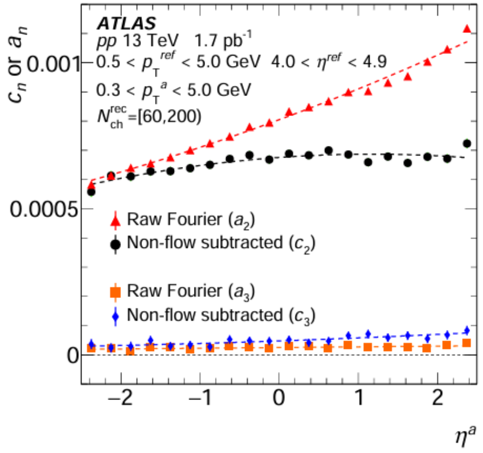
1. Check if the N_{ch} dependence is related to the stronger sub-nucleon fluctuation.

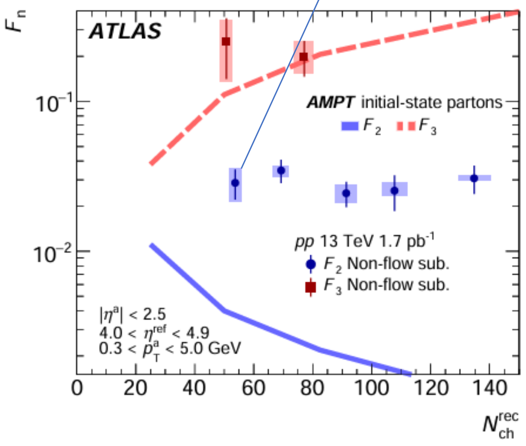
Done. A change in Nch trend is found!

3. Check the decorrelation factor varying with multiplicity and relation to ampt initial conditions.

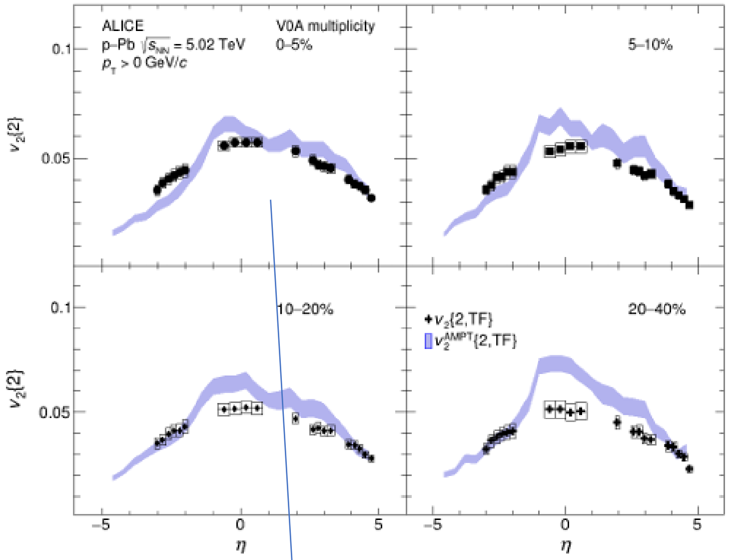
Calculation partly done. η distribution is strange, only done for one high Multi-bin. Not done for N_{ch} dependence yet.

arXiv:2308.16745





arXiv:2308.16590



2. Check the longitudinal decorrelation in eta distribution with sub-nucleon effect.

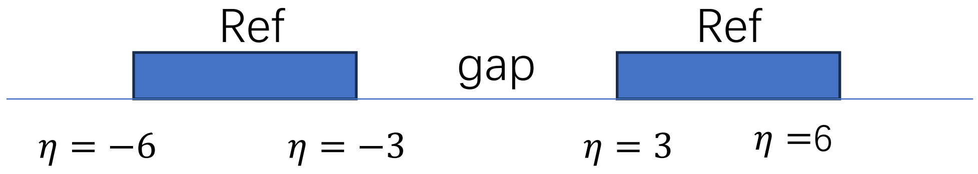
Calculation done. η decorrelation partly found, but strange non-flow subtraction behavior.

1) Can you use exactly the same coverage/cuts as the IS2023 talk to calculate V2Delta for comparisons?
2) top 2 models give too big V2Delta, so sigma_p should be decreased for them.

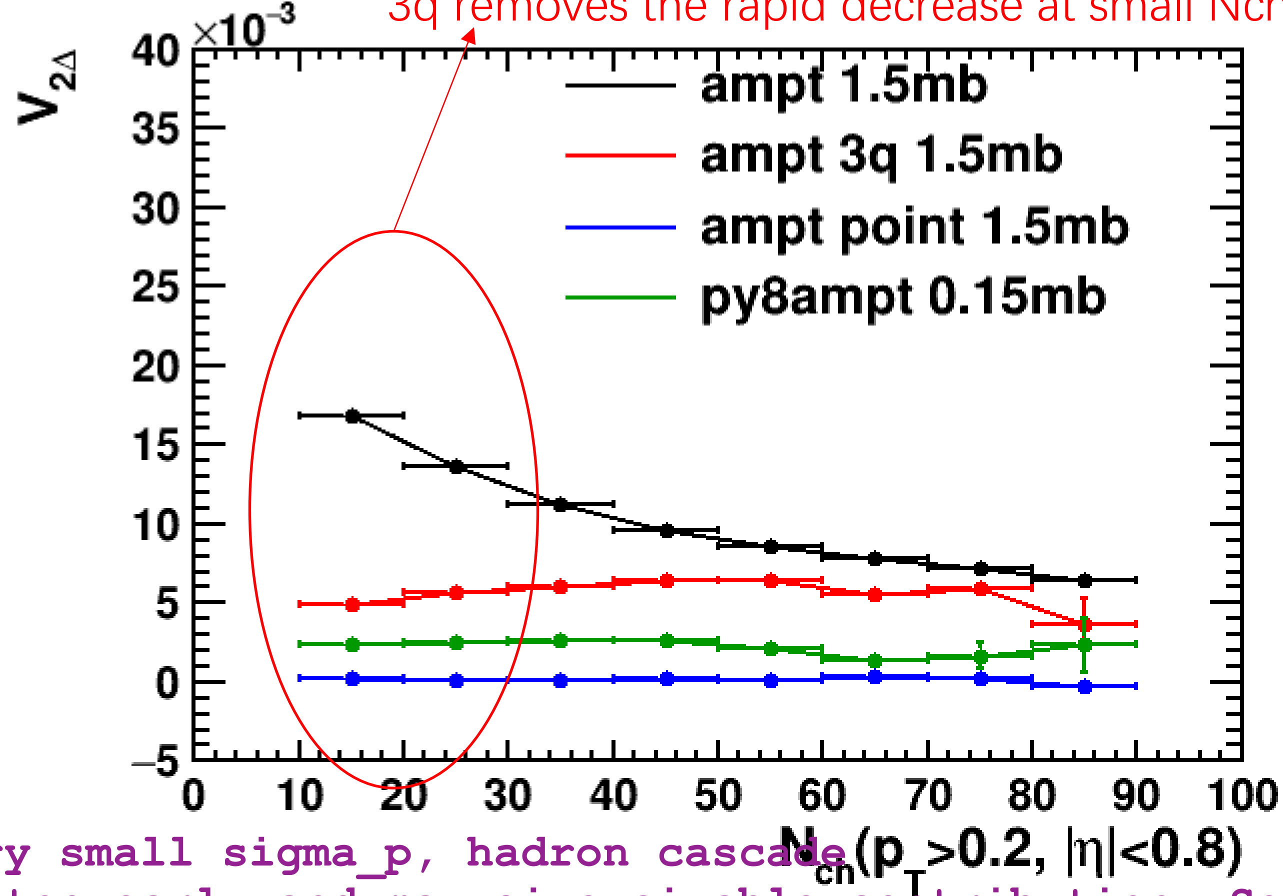
Charged, $|\eta|<6$, $0.3<p_T<3$
$|\Delta\eta|>6$

pp 13 TeV
ampt 1.5mb (public ampt)
ampt 3q 1.5mb (3-quark ampt)
ampt point 1.5mb (point ini geo by hand)

py8ampt (PYTHIA8 initial condition, 3quark)
ART on for all cases
N_{ch} ($p_T>0.2$, $|\eta|<0.8$)
Reference/POI particle:
$0.3<p_T<3$, $|\eta|<6$, $|\Delta\eta|>6$



3q removes the rapid decrease at small Nch!



Template fit method to subtract non-flow:

$$\frac{1}{N_{\mathrm{trig}}}\frac{dN}{d\Delta\phi} = G\cdot\left[1+2\sum_{n=2}^{4}V_{n\Delta}\cos(n\Delta\phi)\right] + F\cdot f_{\mathrm{background}}(\Delta\phi)$$

3) With very small sigma_p, hadron cascade will start too early and may give sizable contribution. So it's best if you also have the initial hadron data (before ART).

$f_{\mathrm{background}}$ using template correlation function from $N_{ch}<10$ to represent the non-flow effect

4) Any p-Pb results?

5) Maybe fbackgd(Delta phi) depends on eta_1 in a strange way in the top 2 models? You can plot fbackgd(Delta phi) to check this.
6) This is ~v2^2, not the decorrelation of v2, right?

N_{ch} (p_T>0.2, |η|<0.8)>40
Reference/POI particle:
0.3<p_T<3, |η|<6, |△η|>6

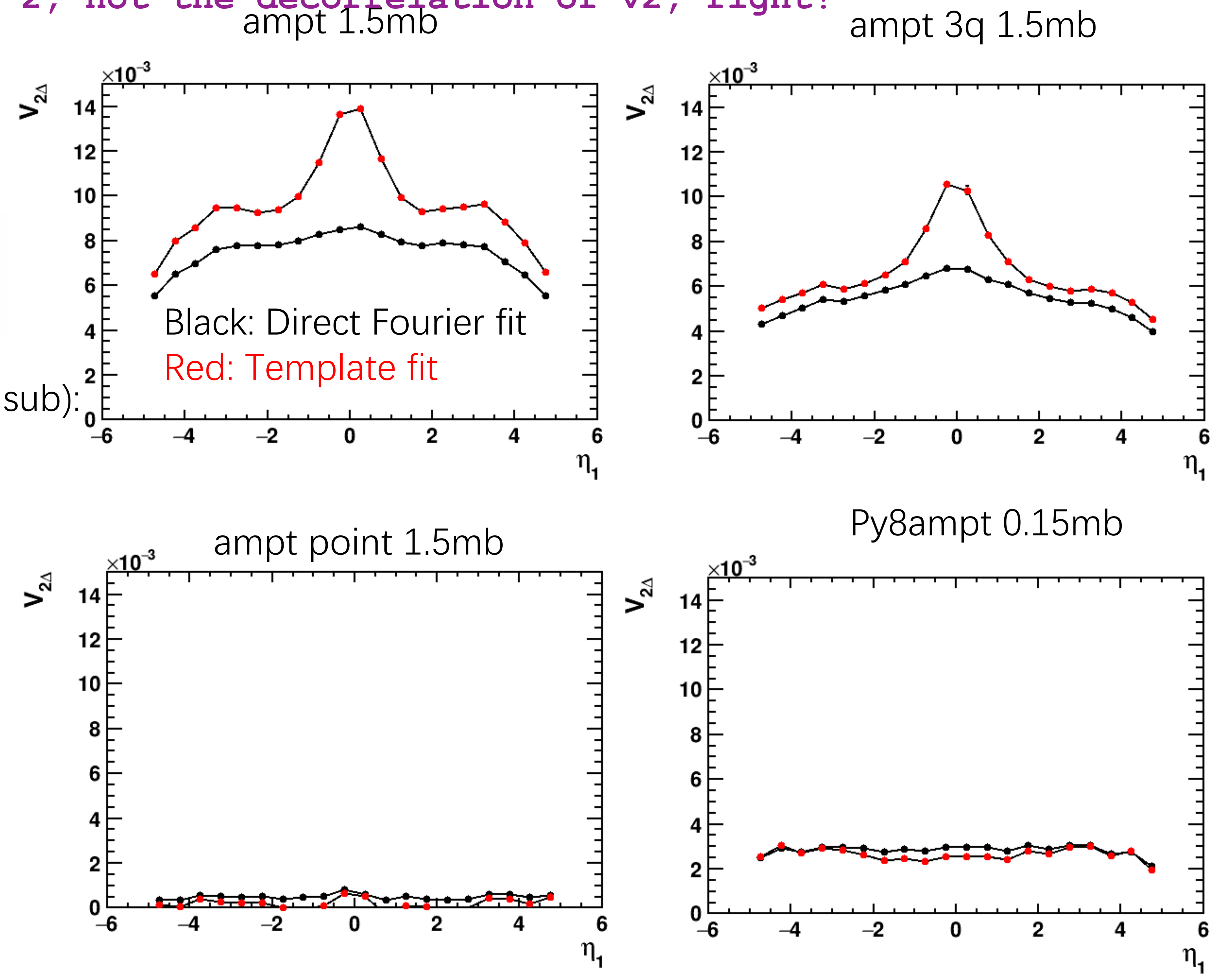
Template fit (non-flow subtracted):

$$\frac{1}{N_{\rm trig}}\frac{dN}{d\Delta\phi} = G\cdot\left[1+2\sum_{n=2}^{4}V_{n\Delta}\cos(n\Delta\phi)\right] + F\cdot f_{\rm background}(\Delta\phi)$$

Direct Fourier fit (non-flow unsubtracted/no-sub):

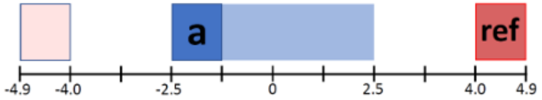
$$\frac{dN}{d\Delta\phi} \propto 1+2\sum_{n=1}^{4}V_{n\Delta}\cos(n\Delta\phi)$$

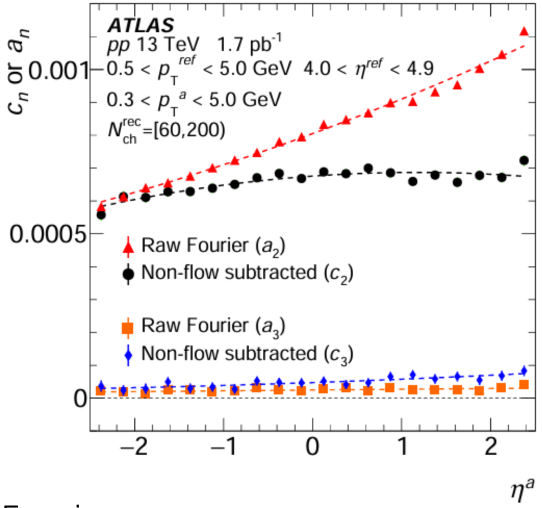
- Different rapidity decorrelation level comparing 3q and normal ampt
- Strange non-flow subtraction effect (subtracted>no-sub) for normal and 3quark ampt 1.5mb case
- Py8ampt weak rapidity dependence, seemingly correct non-flow subtraction ordering



7) Top 2 models a2<c2, but data a2>c2. Could this be because Y^LM has a negative a2? You can check this.
8) 2nd model (ampt3q) has no problem in extracting the slopes; so it's worth to decrease sigma_p and then plot slopes vs ATLAS.

N_{ch} using p_T>0.4, $|\eta|$<2.5
Reference particle:
$0.5<p_T<5$, $4<\eta^{ref}<4.9$, $-2.5<\eta^a<2.5$
Low Mult: $10<N_{ch}<30$
High Mult: $N_{ch}>60$



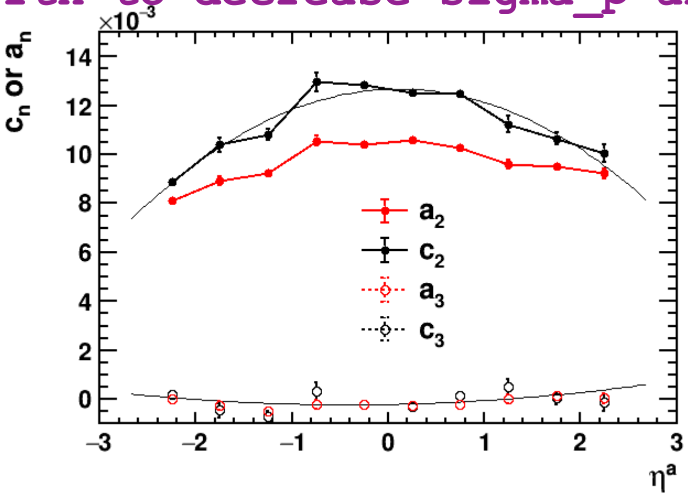


Raw Fourier
$$Y(\Delta\phi,\eta_a) = G\{1 + 2\sum_{n=1}^{4} a_n(\eta^a)\cos(n\Delta\phi)\}$$

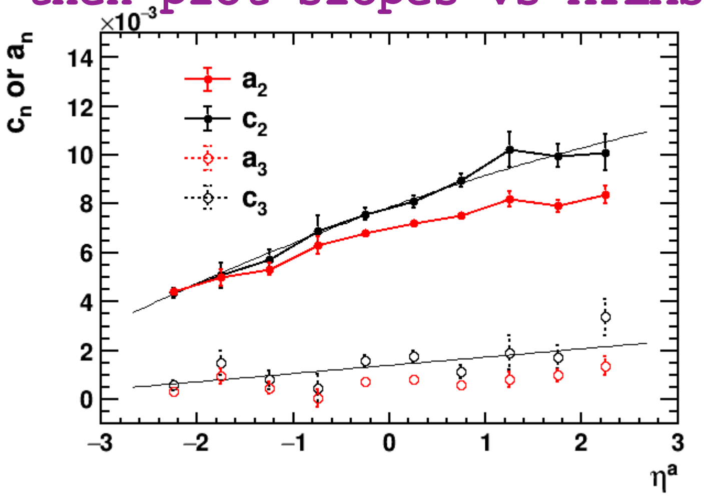
Template fit
$$Y^{HM}(\Delta\phi,\eta_a) = F(\eta_a)Y^{LM}(\Delta\phi,\eta_a) + G(\eta^a)\{1 + 2\sum_{n=2}^{4} c_n(\eta^a)\cos(n\Delta\phi)\}$$

Rapidity decorrelation fit
$$c_n(\eta_a)\ \ or\ a_n(\eta_a) = A(1 + F_n\cdot\eta^a + S_n\cdot(\eta^a)^2)$$

ampt 1.5mb



ampt 3q 1.5mb



- Similar non-flow subtraction behavior compared to the last page result
- Non-symmetric η^a distribution in ampt 3q case after non-flow subtraction
- Possibly zero c_3

Py8ampt 0.15mb