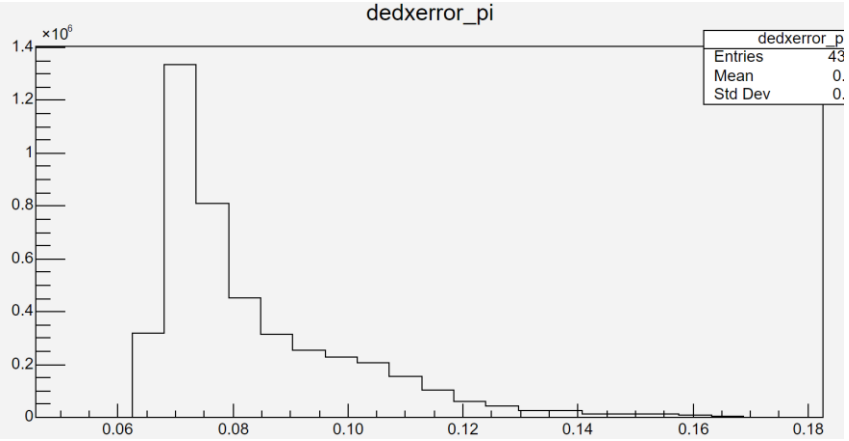
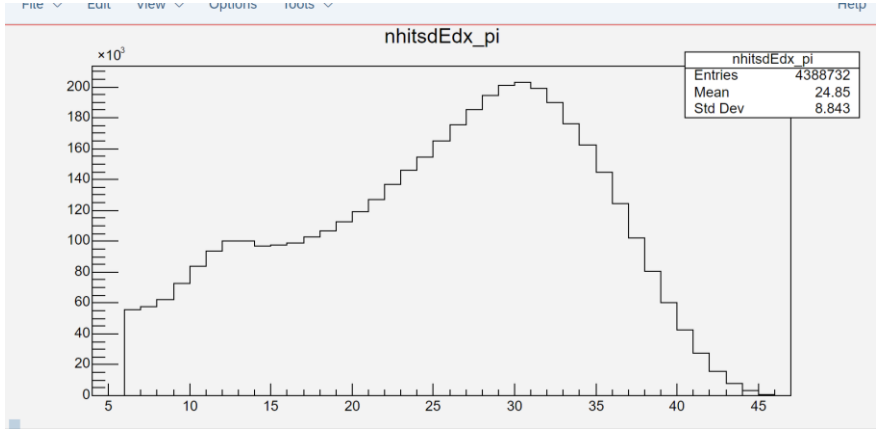
New Tree vs Old Tree

	New Tree	Old Tree
Pre Cuts	Nhitsdedx > 5, Nhits > 15	0.04<dEdxError<0.12, Nhits > 15
New Branches	Nhits, Nhitsdedx, dEdxError,VpdVz	N/A
Centrality Def	good centrality weight	bad weight
Triggers	3 more (expect 10% more events)	only 1 trigger

1. About pre cut:
   Probably old tree also has Nhitsdedx cut
   Tried to remove Nhitsdedx cuts when producing the new tree, still can see a cutoff with Nhitsdedx >= 6 (checked mc&data tree)
   Maybe somewhere it's set as default

   For dEdxError, I can successfully remove the cut





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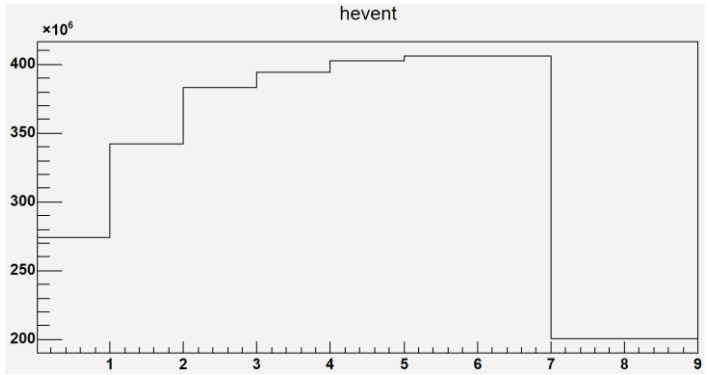
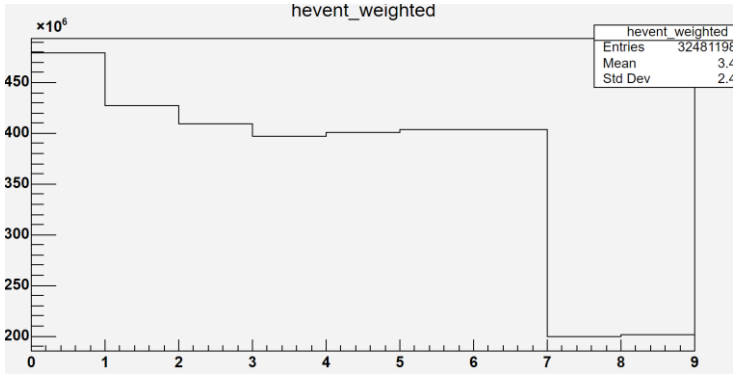
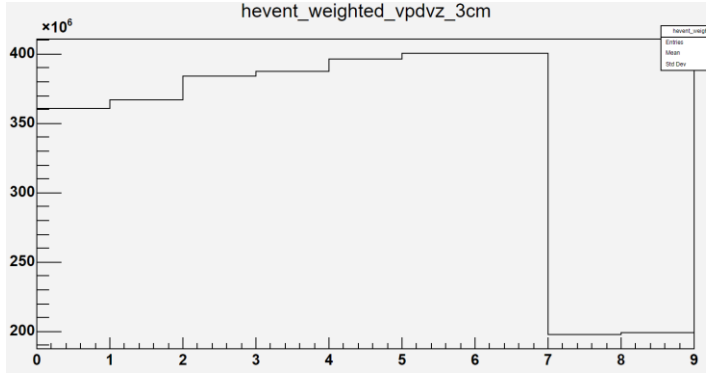
New Branches	Nhits, Nhitsdedx, dEdxError,VpdVz	N/A
Centrality Def	good centrality weight	bad weight
Triggers	3 more (expect 10% more events)	only 1 trigger

2. About branches:
   Added VpdVz to apply |Vz-VpdVz| < 3.
   Yuan told me they all applied this cut







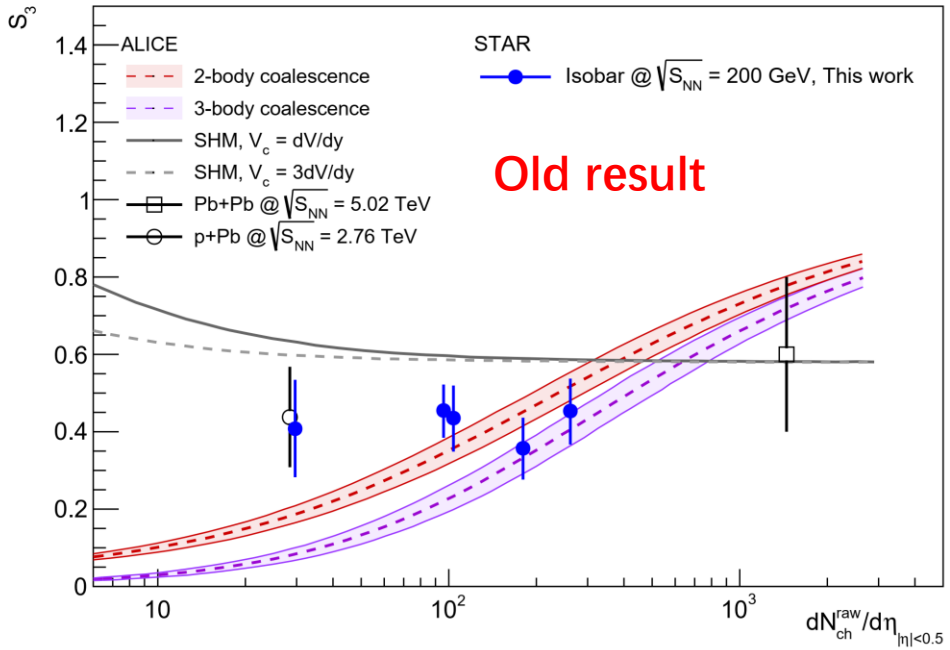
New Tree vs Old Tree

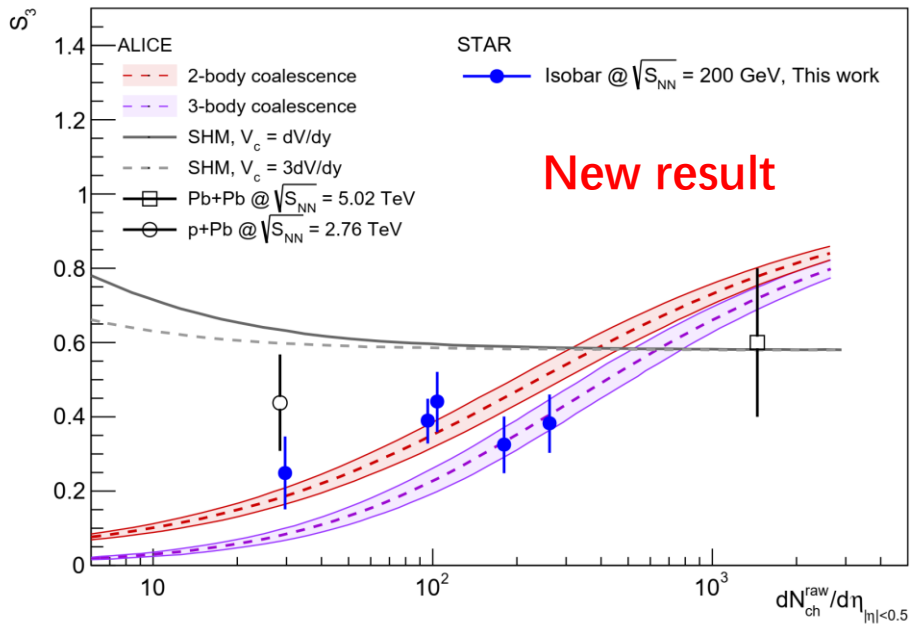
	New Tree	Old Tree
Pre Cuts	Nhitsdedx > 5, Nhits > 15	0.04<dEdxError<0.12, Nhits > 15
New Branches	Nhits, Nhitsdedx, dEdxError, VpdVz	N/A
Centrality Def	good centrality weight	bad weight
Triggers	3 more (expect 10% more events)	only 1 trigger

3. About triggers:
   Did not save trigger ID as a new branch, because I don't think there should be difference between different triggers

TriggerId	Name	First run	Last run	#Runs
600001	vpdmb-30	19074001	19074075	~70
600011	vpdmb-30	19075032	19079025	~4000
600021	vpdmb-30	19079026	19080013	~1000
600031	vpdmb-30	19080075	19129014	~50000

New Tree vs Old Tree



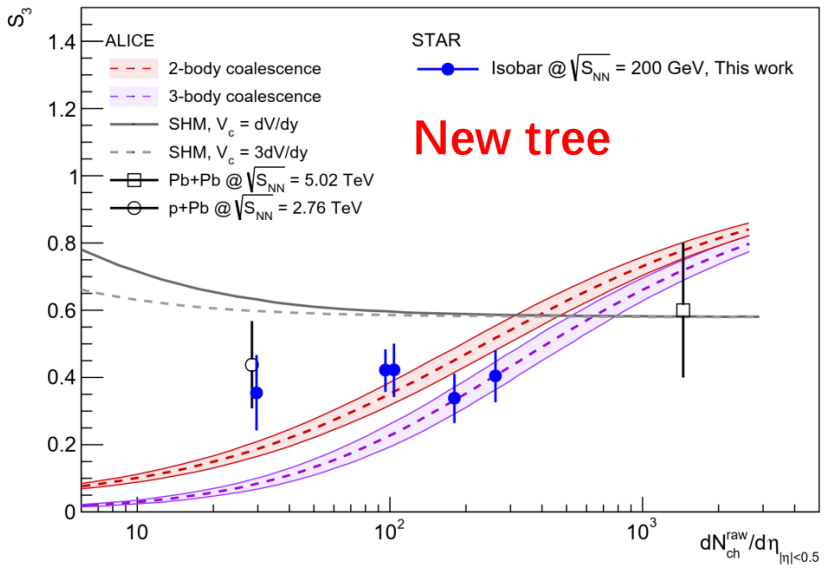


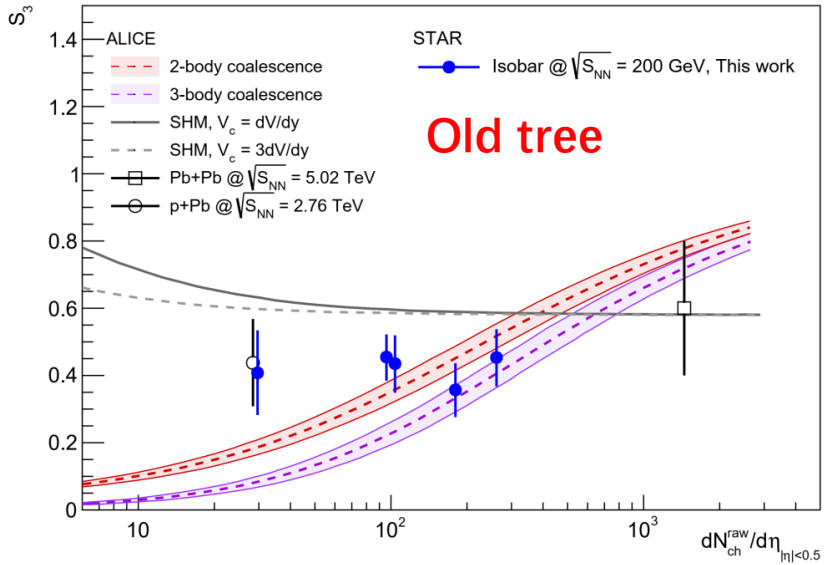
Possible source	old	new
Nhits cut	>15	>20
Dedxerror cut	[0.04,0.12]	N/A
Cent weight	N/A	Used

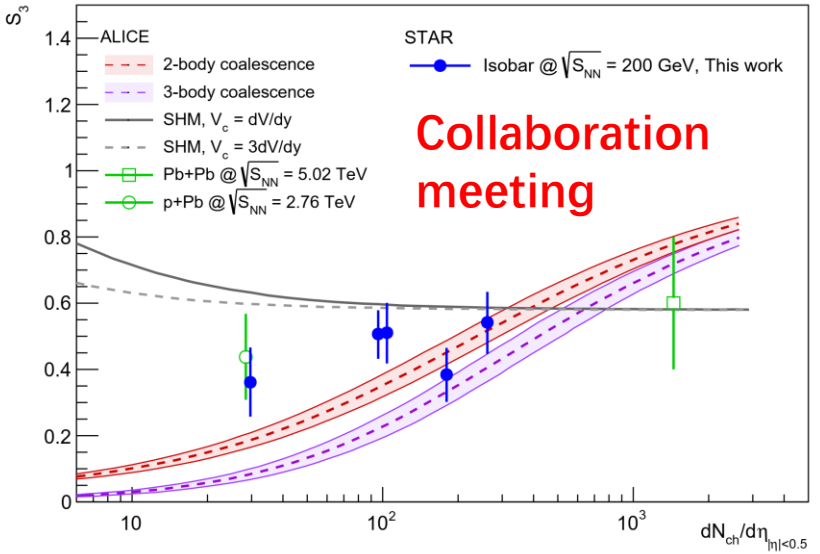
New Tree vs Old Tree

Analyze new/old tree with same cuts
(assume somewhere we have a default cut for nHitsdedx >= 6)

Analysis Cuts	
Chi2topo	<=3
Chi2ndf	<=5
Chi2primary_pi	>=10
Chi2primary_he	<=2000
Ldl	>=3.5
L	>=3.4
Dca_he	<=1
P_he	>=2







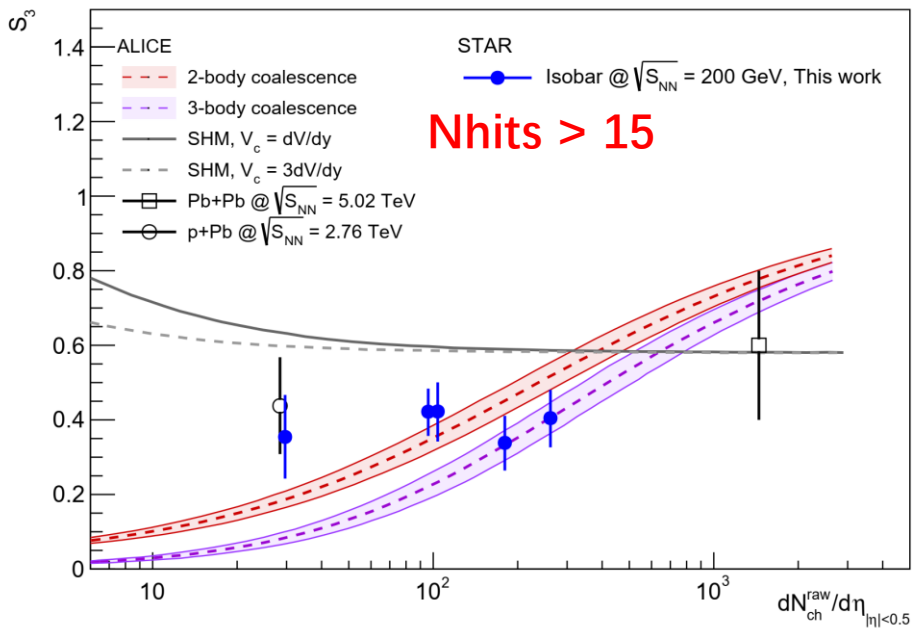
Also added 0.04<dEdxError<0.12 for new tree
Won't apply nhits or |Vz-Vpdvz| cut or centrality weight

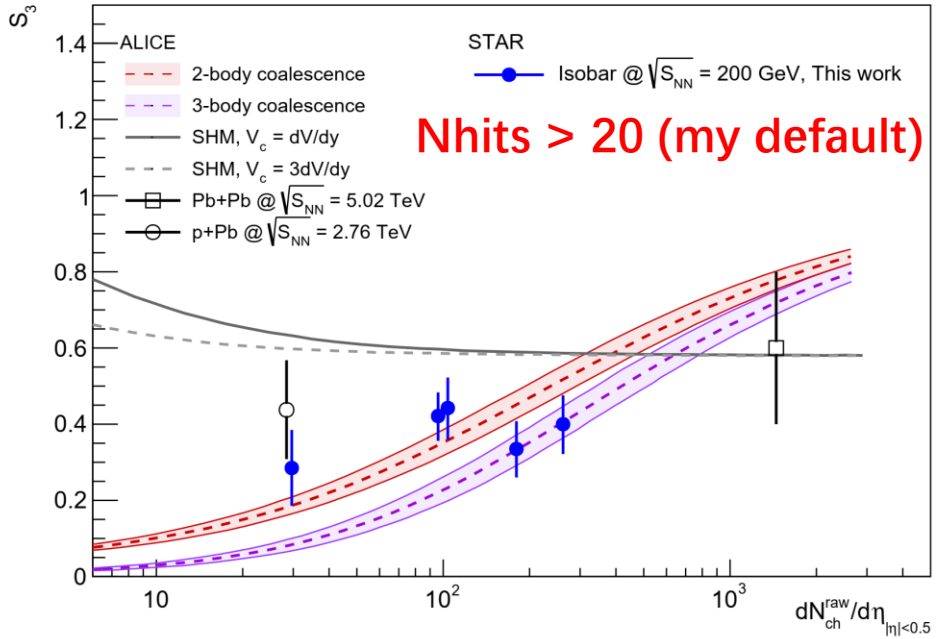
I can only appeal to fluctuation to explain the change

Also note that here I use **chi2topo<=3(Yue-hang recommended this one).**
It makes my results different from what I showed at collaboration meeting. **It is considered as systematics now**

New Tree vs Old Tree

Analyze new/old tree with different Nhits cut



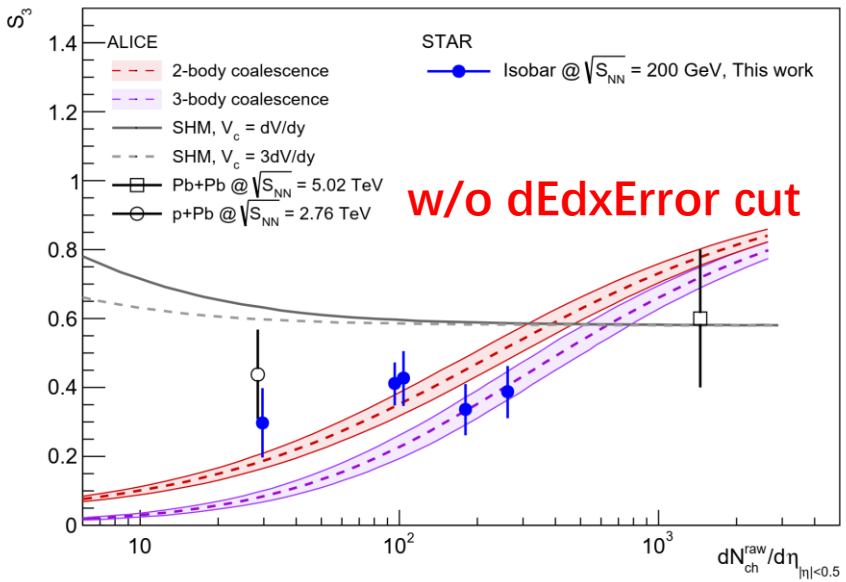


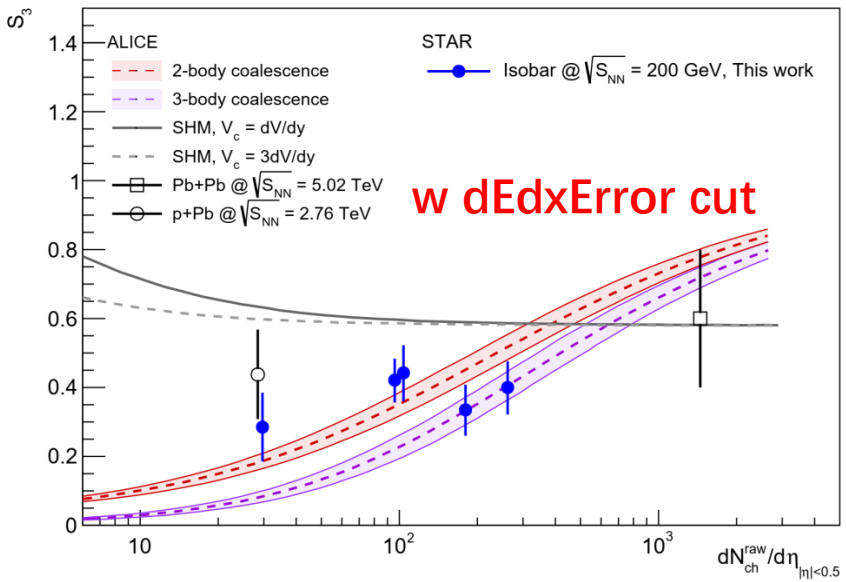
Same as last slide, but will apply nhits>20 this time (need variation for systematic analysis: 15 20 25, 20 is default)

For default case, 40-80% will be lower, 20-40% higher

New Tree vs Old Tree

Analyze new/old tree w or w/o dEdxError cut



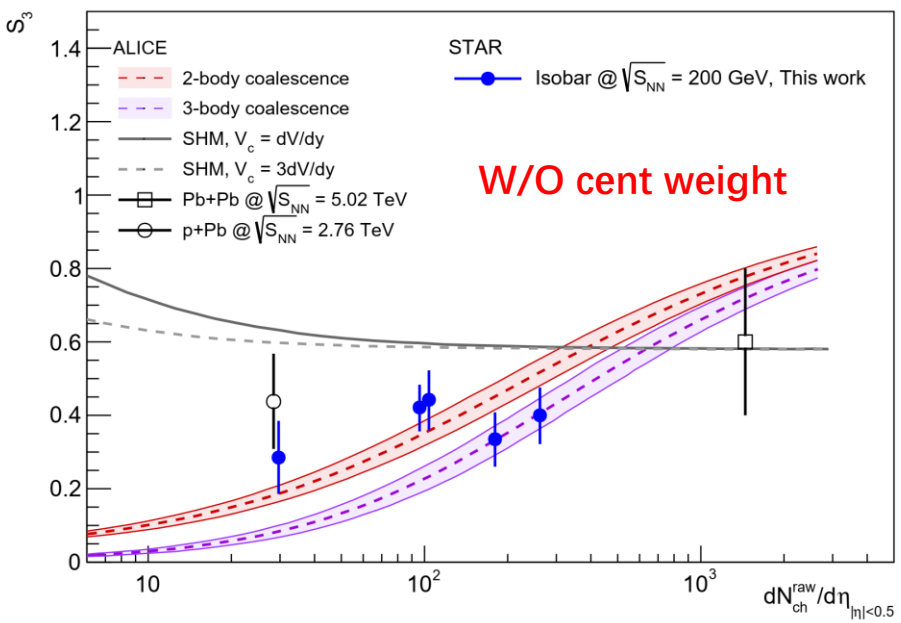


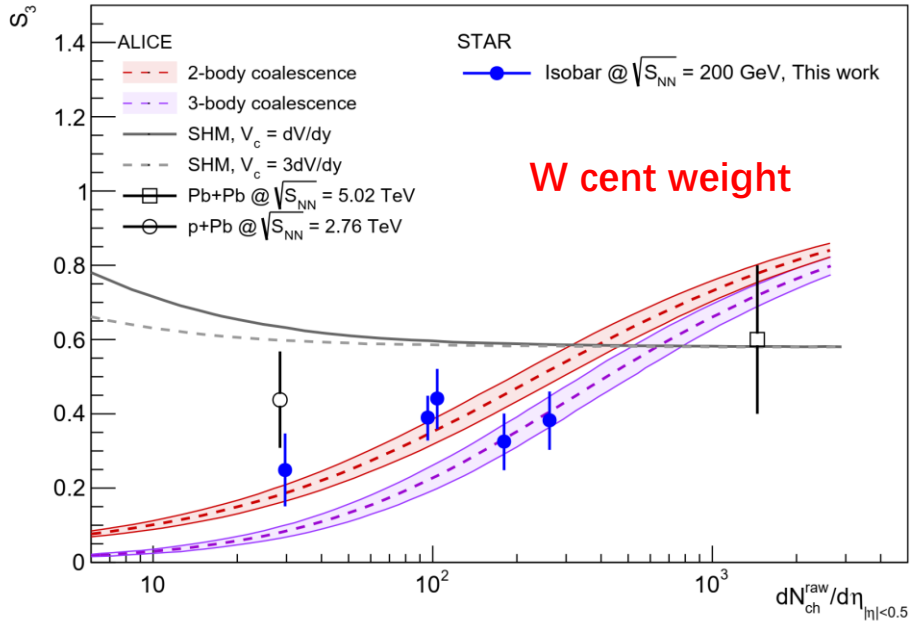
Same as last slide (nhits>20), but will remove dEdxError cut

Negligible difference.
40-80% slightly higher without dEdxError cut

New Tree vs Old Tree

Analyze new/old tree with centrality weight & |Vz-Vpdvz| < 3, but without dEdxError cut





Same as last slide, but centrality weight is applied.

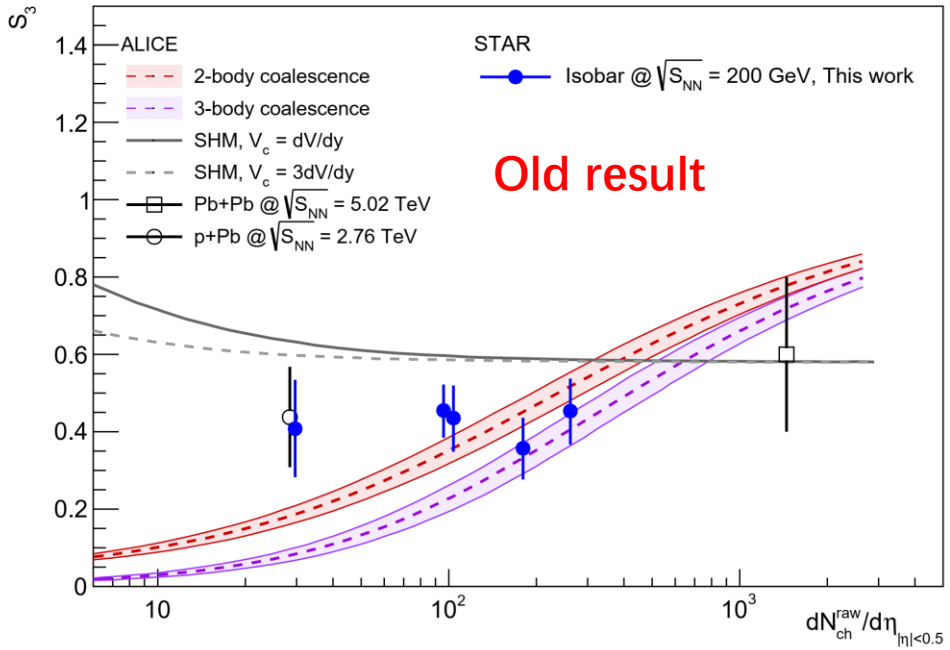
I checked that

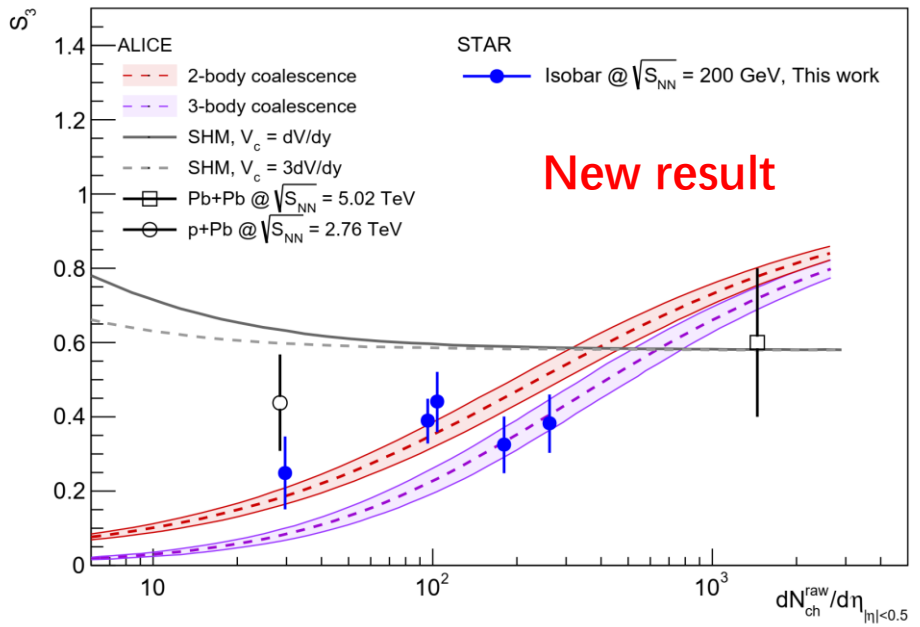
In the 70-80% bin, there are barely H3L counts, but their weight should be large

My total H3L counts in 0-80% is not changing much after applying centrality weight

So maybe it's OK to see first two points become lower.

New Tree vs Old Tree





Possible source	old	new	effect on 40-80% new result
Nhits cut	>15	>20	lower
Dedxerror cut	[0.04,0.12]	N/A	negligible
Cent weight	N/A	Used	lower

I'm not sure about the check. Because I'm still confused by the nHitsdedx >= 6 cutoff, I find it nowhere. So I'm not sure whether the old tree really has this cut or not.

Tune Cuts

Tuned by hand, I tend to use loose cuts.

In the 40-80% centrality, I have low background. It is overkill to use tight cuts to further suppress it

Now we assure

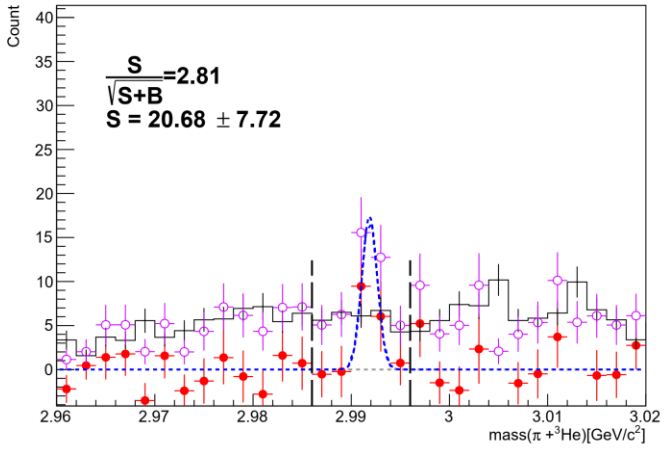
2-sigma significance in each pT bin

3 pT-bins for all centralities

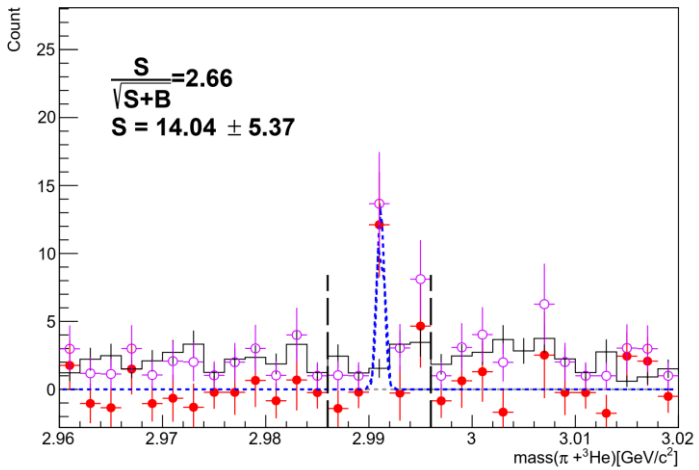
Analysis Cuts	
Chi2topo	<=3
Chi2ndf	<=3
Chi2primary_pi	>=7
Chi2primary_he	<=2000
Ldl	>=3.
L	>=3.
Dca_he	<=1.5

Cut on p_he is removed

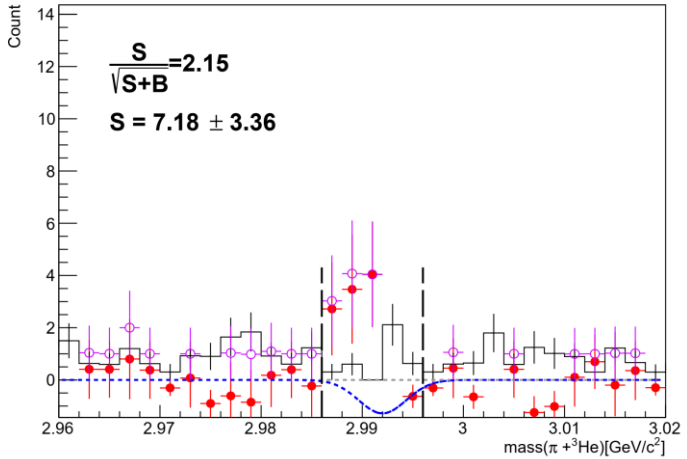
hm_1_id(0)_cent9(0,4)_pt(1.59,2.34)



hm_1_id(0)_cent9(0,4)_pt(2.34,3.08)



hm_1_id(0)_cent9(0,4)_pt(3.08,4.04)



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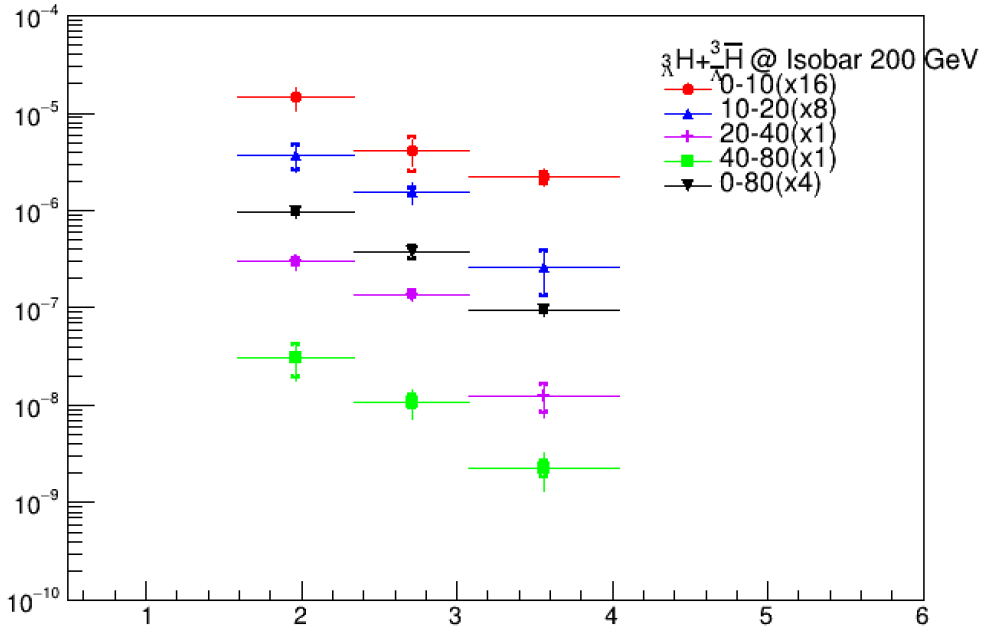

Systematics are calculated bin by bin, cent by cent.
Not by estimating with 0-80% results yet

Maybe can get more points for central collision, fit will be easier