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Analysis Update: MC study for pp collisions at $\sqrt{s} = 13$ TeV ¶

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Motivation

To propose a possible measurement to study new effects in events with a high number of MPI that could be measured with a device that has a wide coverage in pseudorapidity $|\eta| < 4$.

Features

$$|\eta| < 4$$

Near Side (NS):

$$|\phi| < \frac{\pi}{3}$$

Away Side (AS):

$$|\phi| > \frac{2\pi}{3}$$

Transverse Side (TS):

$$\frac{\pi}{3} < |\phi| < \frac{2\pi}{3}$$

$P_{\mathrm{T}}^{\mathrm{leading}}$: The largest P_{T} produced by a jet at the event.

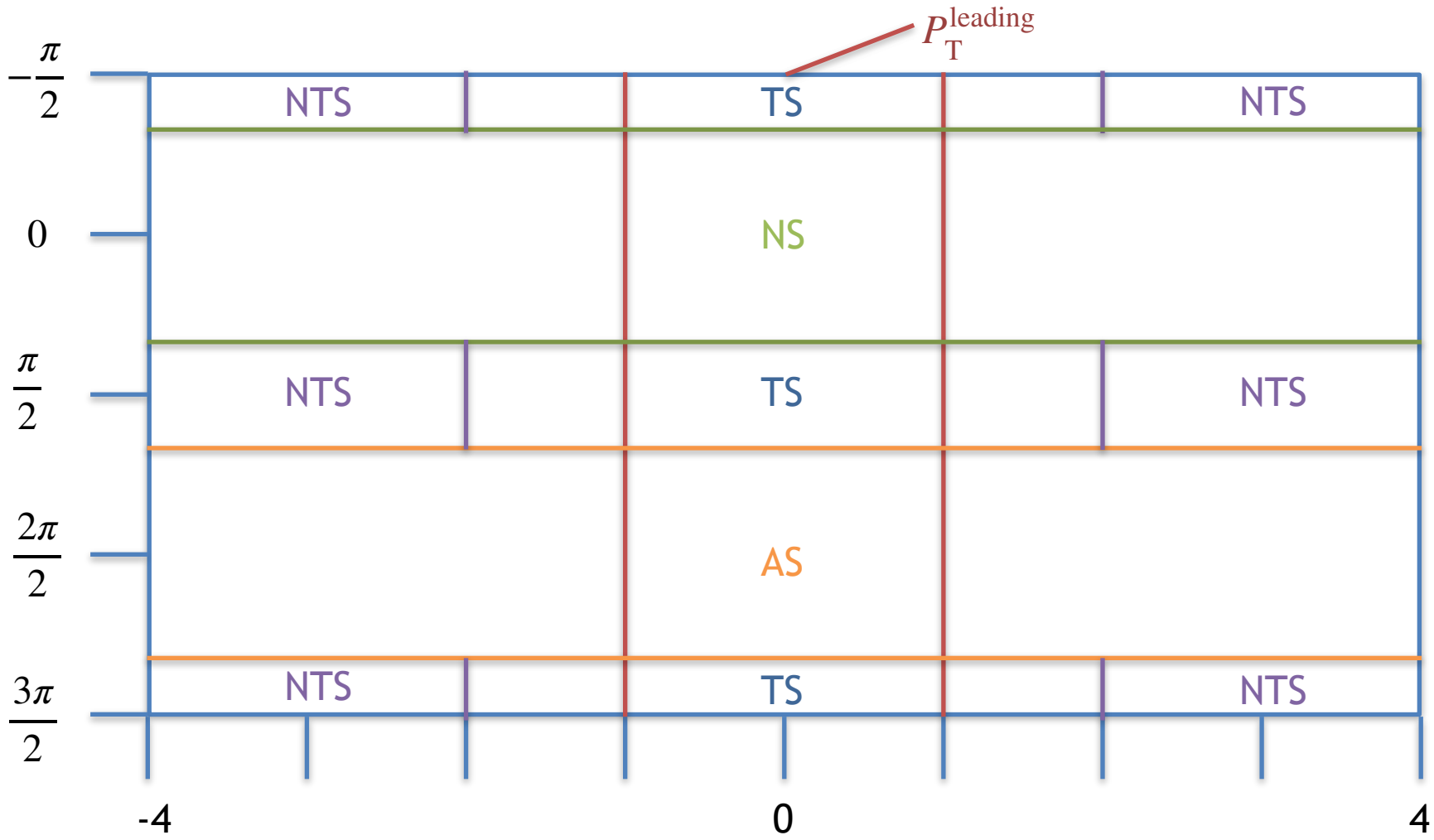
$$0.15\ \frac{GeV}{c} < P_{\mathrm{T}}^{\mathrm{leading}} < 50\ \frac{GeV}{c}$$

$$|\eta| < 0.8$$

$P_{\mathrm{T}}^{\mathrm{assosiated}}$: P_{T} associated with the other hadrons in the jet.

$$0.15 < \frac{GeV}{c} < P_{\mathrm{T}}^{\mathrm{associated}}$$

New Topological region



$|\eta| < 4$

$-\frac{\pi}{2} < \Delta\phi < \frac{3\pi}{2}$

NTS

$|\Delta\eta| < 3.2$
and
$|\Delta\eta| > 2$

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Colour Reconnection (CR)

Mechanism that allows the partons to interact before hadronizing.

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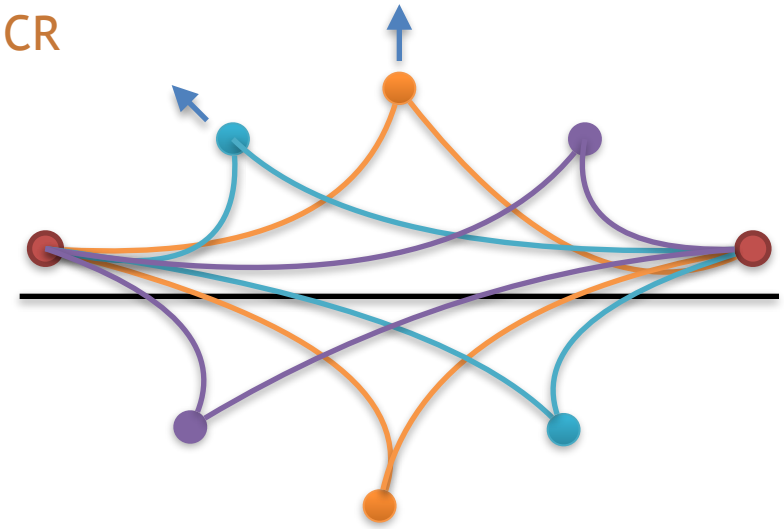
The MPI-based original Pythia 8 scheme.

Beam remnants

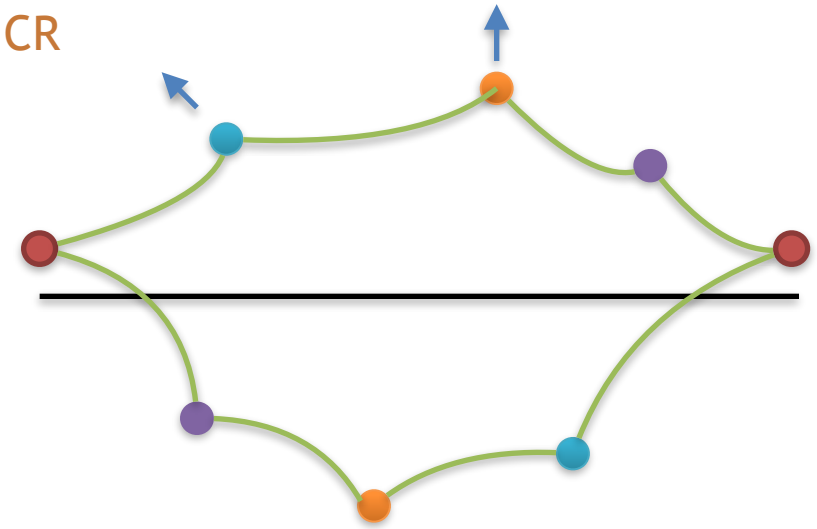
Gluons and quarks

Without CR



N_{ch} ~ 12 $\langle N_{ch}^{S} \rangle$

With CR

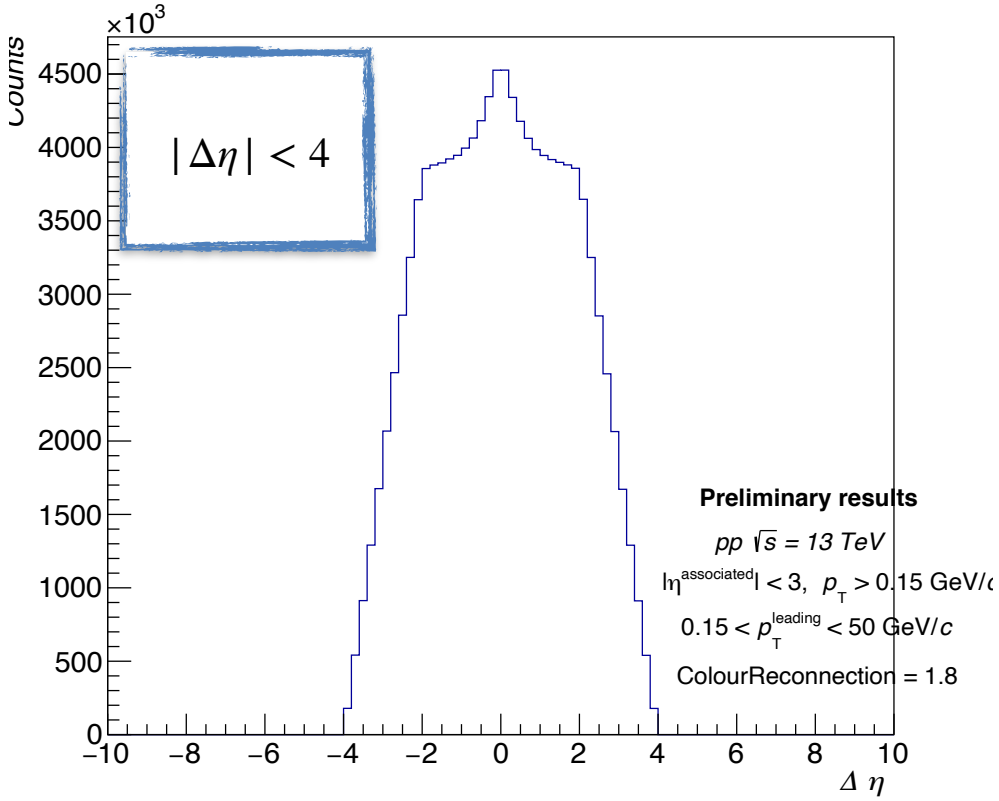


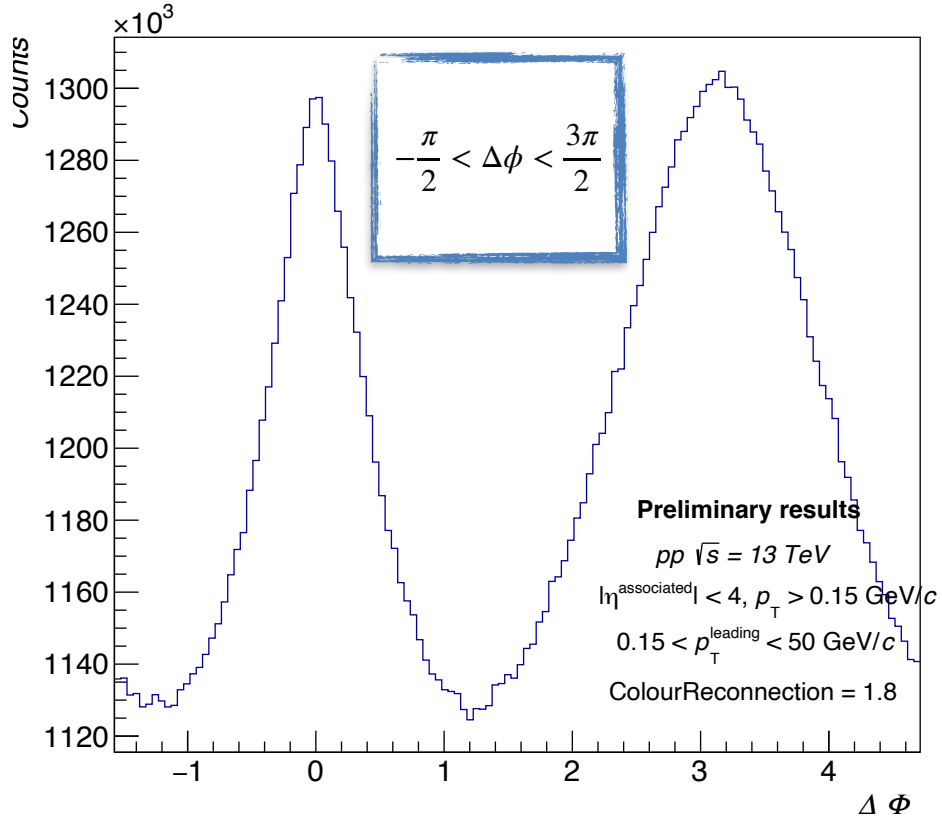
N_{ch} ~ 8 $\langle N_{ch}^{S} \rangle$

Hadronic correlations

For each pair of particles, the hadronic correlations can be defined as follows

$$\Delta\eta = \eta^a - \eta^l$$
$$\Delta\phi = \phi^a - \phi^l$$





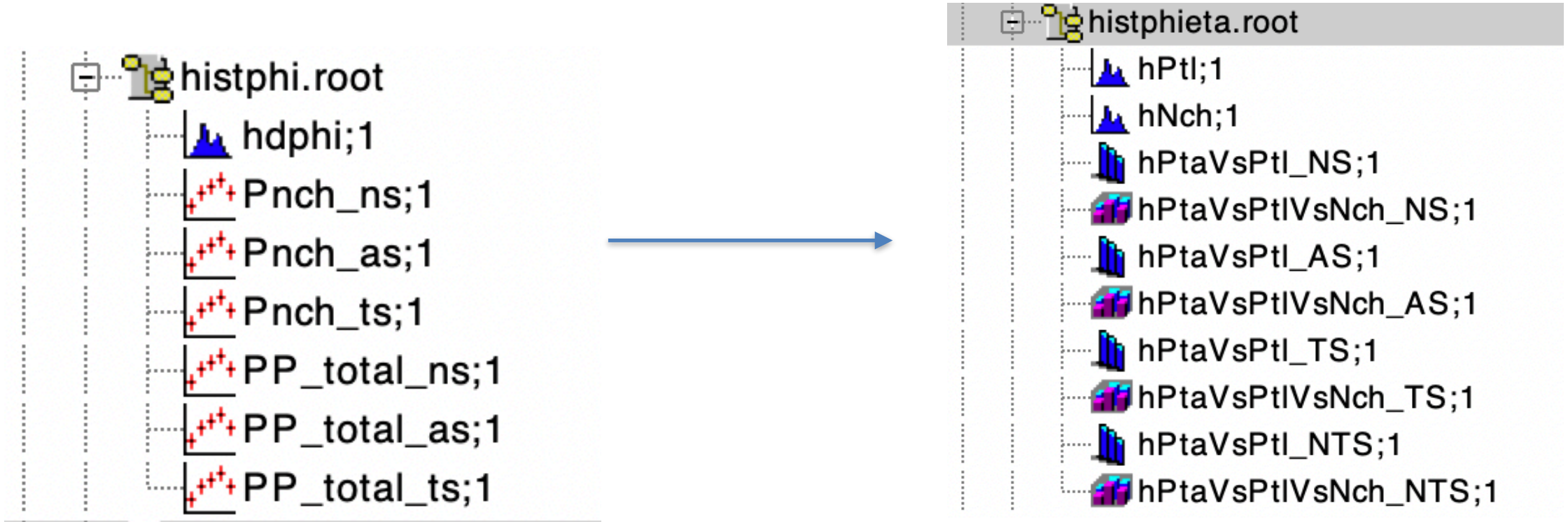
In the previous presentation

- Study how $< p_{\mathrm{T}} >$ changes considering different windows of total multiplicity.

- Add the parameter $\frac{\rho}{< \rho >}$ to distinguish between high and low MPI.

- Include other event generators in the analysis

So far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Pnch_as;1
Pnch_ts;1
PP_total_ns;1
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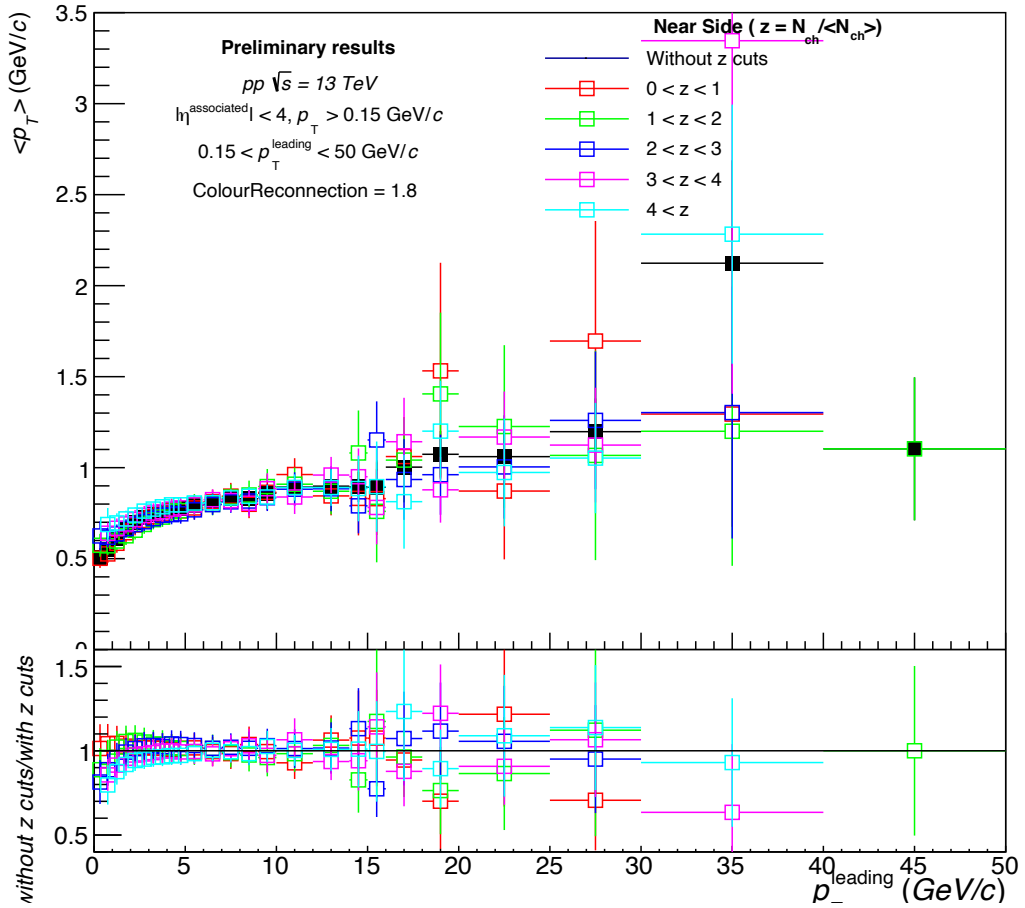
hPtaVsPtI_TS;1
hPtaVsPtIVsNch_TS;1
hPtaVsPtI_NTS;1
hPtaVsPtIVsNch_NTS;1

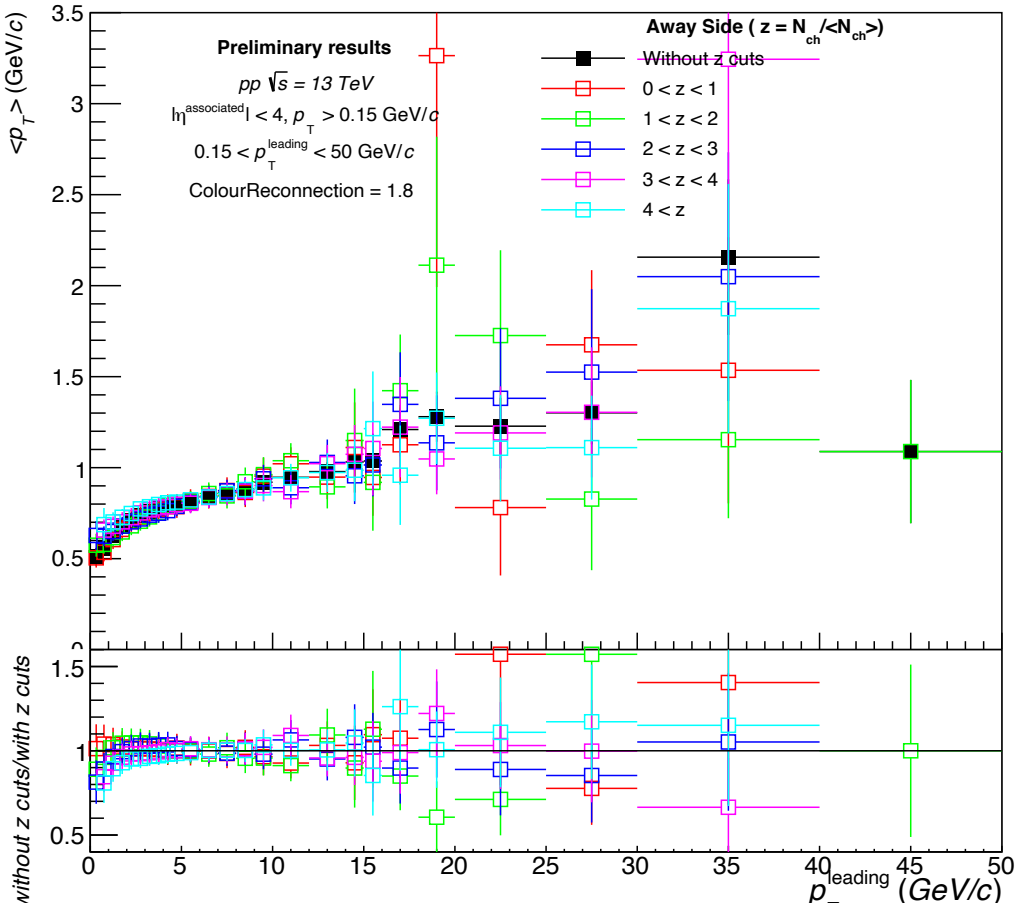
$< p_{\mathrm{T}} >$ distribution

New Variable:

$$z = \frac{N_{ch}}{< N_{ch} >}$$

Spectra is studied to observe a possible effect of additional contamination coming from the hard process.





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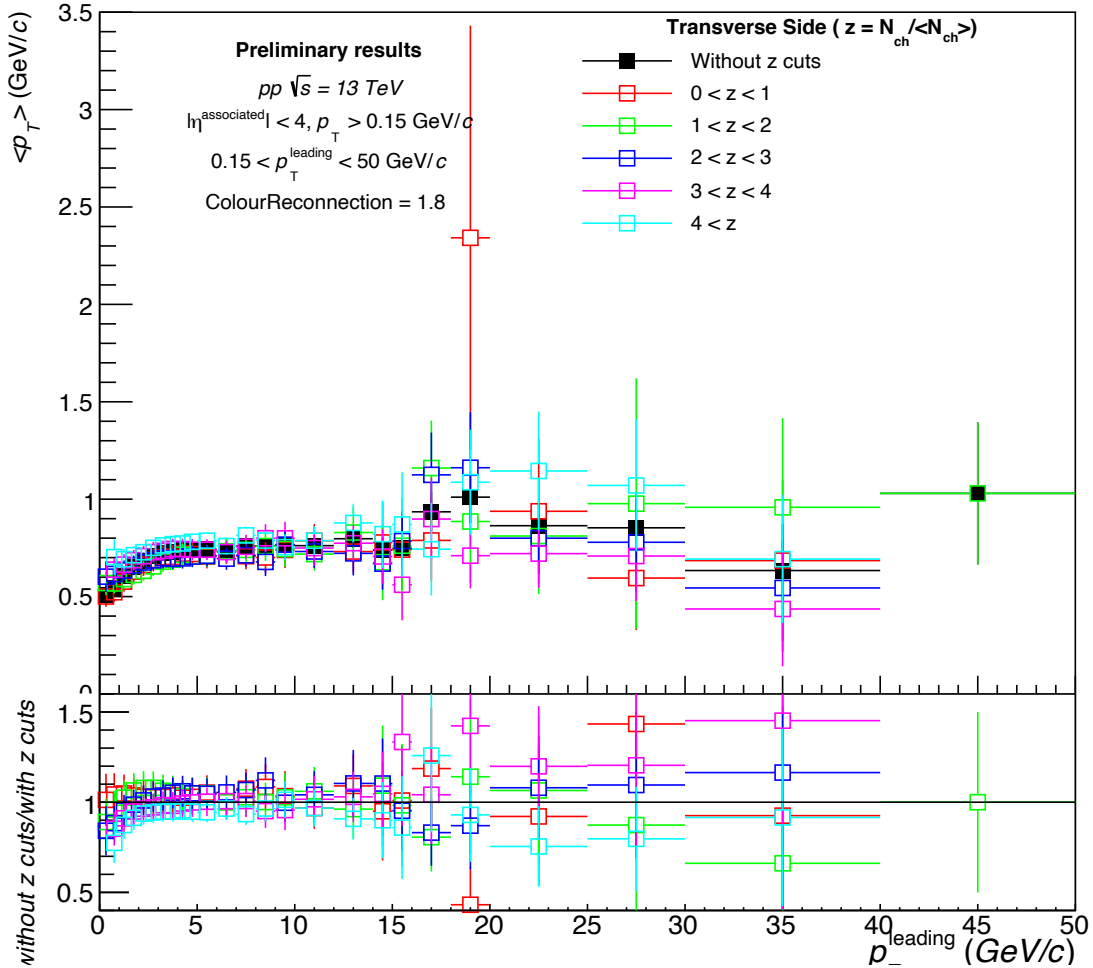

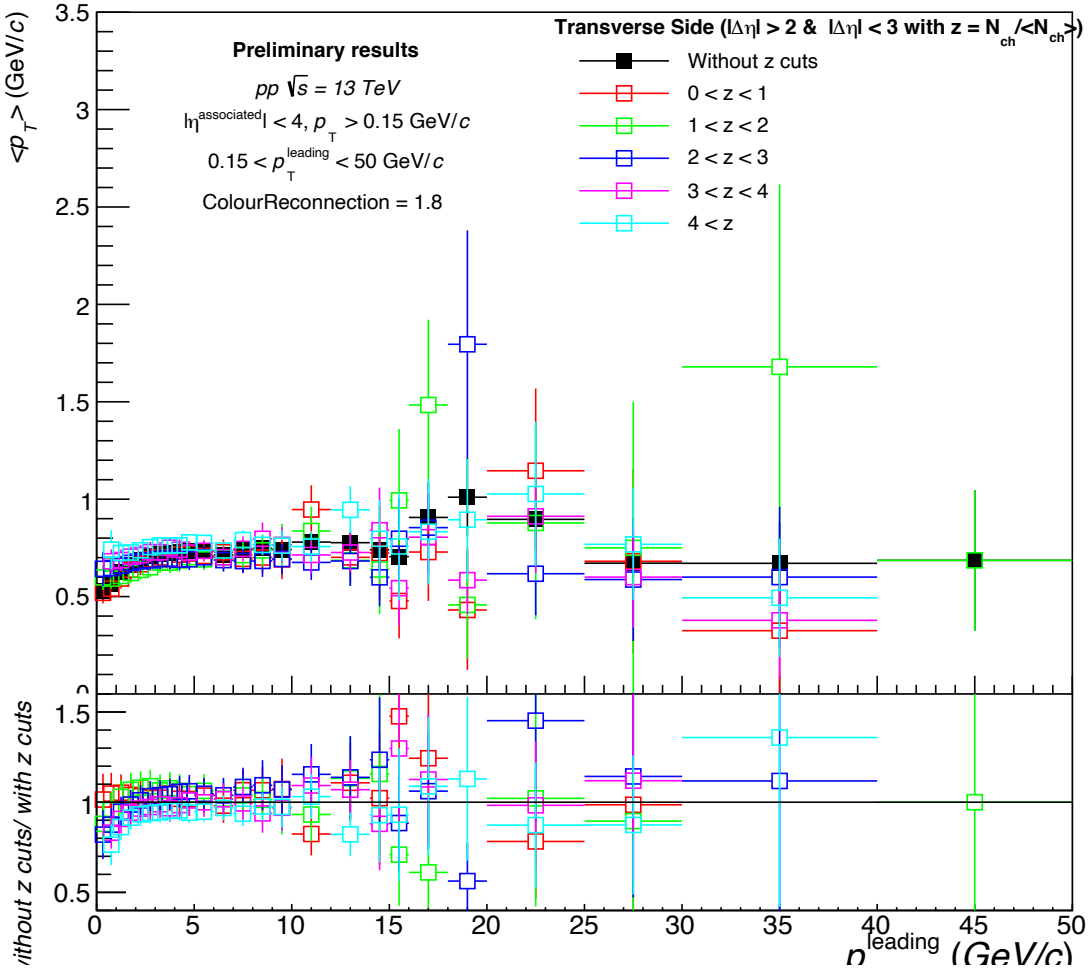

Thank you