

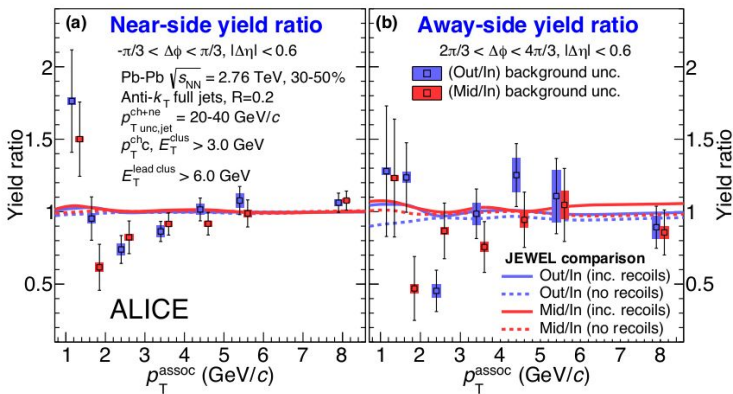
Measuring jet constituent yields in $\sqrt{s_{NN}} = 5.02$ TeV Pb-Pb collisions using jet-hadron correlations with ALICE



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Acknowledgments:
Joel Mazer (Rutgers)



“Jet-hadron correlations measured relative to the second order event plane in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV”

Phys. Rev. C 101, 064901

S. Acharya et. al.

Jet-hadron correlations

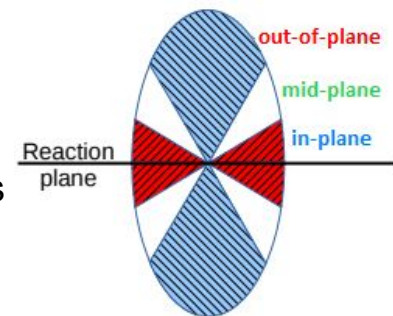
$\Delta\phi$ - azimuthal separation (b/w jet axis and assoc. hadron)

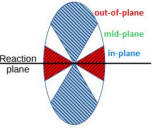
$\Delta\eta$ - pseudorapidity separation (b/w jet axis and assoc. hadron)

Jet-hadron constituent yields

$\frac{dN}{dp_T}$ - measure of particle spectra in jets

How does jet orientation with respect to event plane affect yields for Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV ?





In-plane: $|\varphi_{\text{jet}} - \Psi_2| < \pi/6$
Mid-plane: $\pi/6 < |\varphi_{\text{jet}} - \Psi_2| < \pi/3$
Out-of-plane: $\pi/3 < |\varphi_{\text{jet}} - \Psi_2| < \pi/2$

Raw correlation function, (scaled by eff.), **in-plane**

Pb-Pb $\sqrt{s_{\text{NN}}} = 5.02$ TeV, 30-50 %

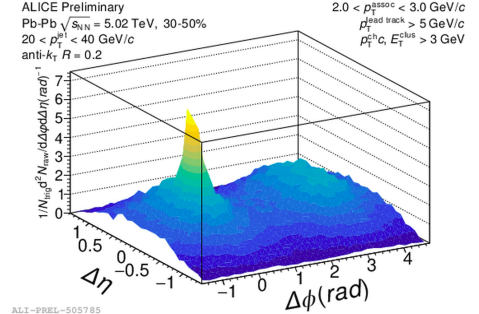
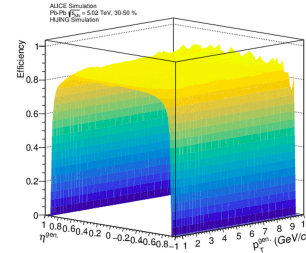
Track Selection:
 $\chi^2 / \text{N.D.F} < 4.0$
 $|\eta| < 0.9$
 $p_T > 150$ MeV/c

$R = 0.2$ anti- k_T full jets

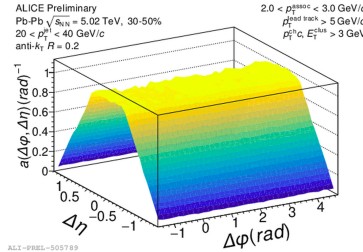
$20 \text{ GeV}/c < p_T^{\text{jet}} < 40 \text{ GeV}/c$

$p_T^{\text{assoc.}}$: [0.5, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 10.0] GeV/c

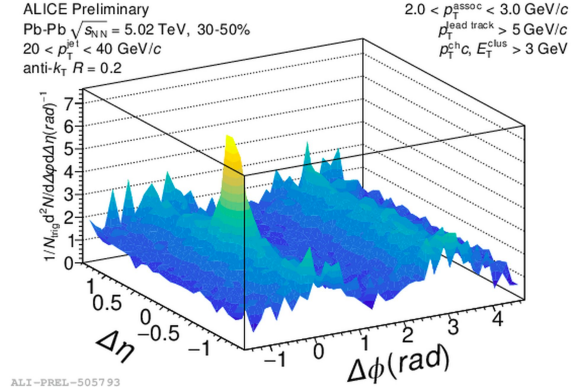
1. Measure correlations, scale by single track reconstruction efficiency

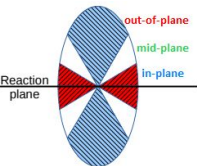


2. Correct for acceptance using mixed events technique (divide raw corr.)



Corrected correlation function, **in-plane**

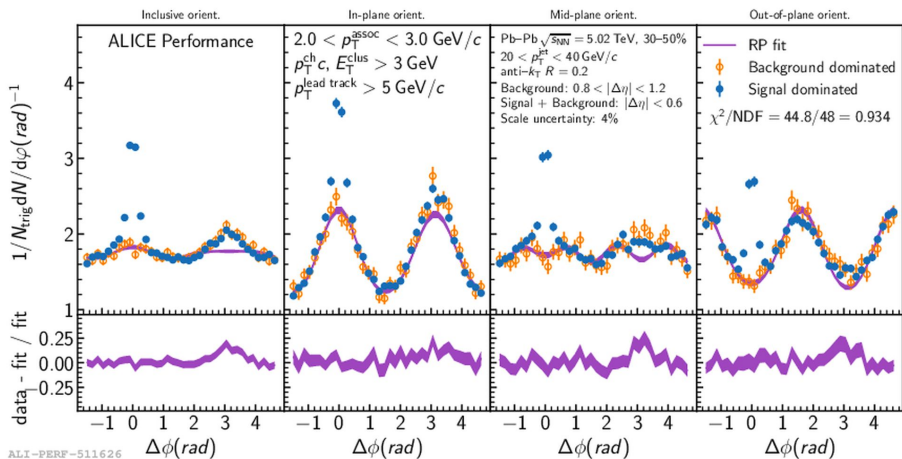




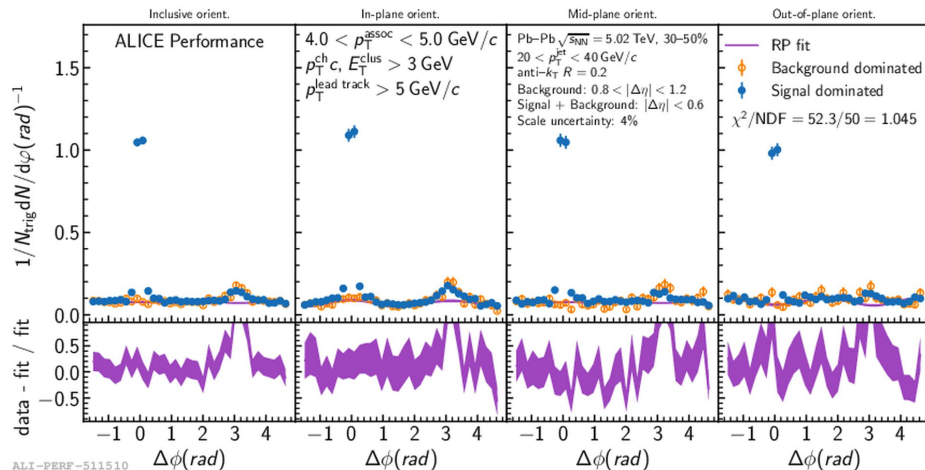
Pb-Pb, $\sqrt{s_{NN}} = 5.02$ TeV, 30-50 %

In-plane: $|\varphi_{jet} - \Psi_2| < \pi/6$ **Mid-plane:** $\pi/6 < |\varphi_{jet} - \Psi_2| < \pi/3$ **Out-of-plane:** $\pi/3 < |\varphi_{jet} - \Psi_2| < \pi/2$

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- p_T^{jet} : 20-40 GeV/c, $p_T^{assoc.}$: **2-3 GeV/c**

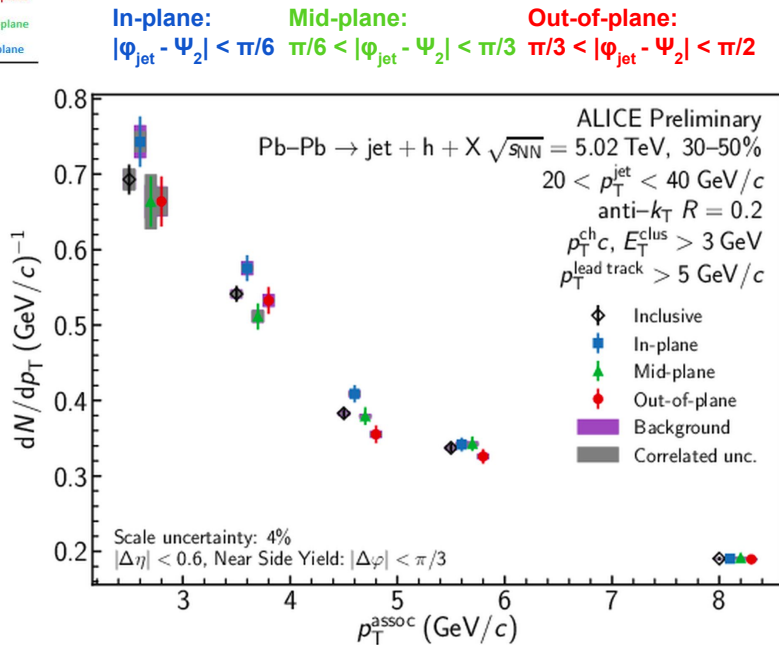
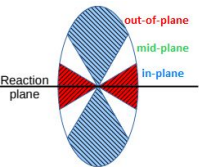


- p_T^{jet} : 20-40 GeV/c, $p_T^{assoc.}$: **4-5 GeV/c**

Reaction Plane Fit (Phys.Rev.C 93 (2016) 4, 044915)

Fit on near side only ($|\Delta\phi| < \pi/3$, $0.8 < |\Delta\eta| < 1.2$)

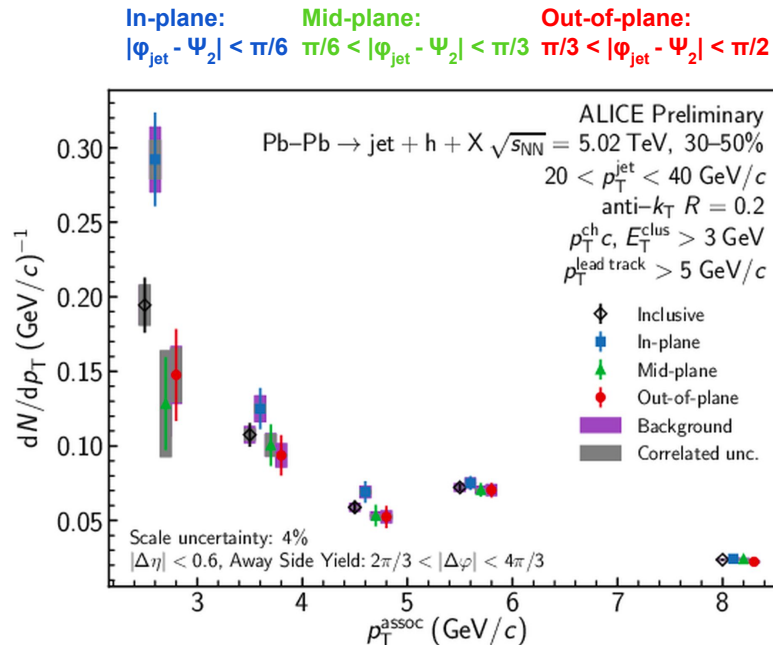
Results - jet constituent yields



ALI-PREL-505725

Near-side yields (NS)

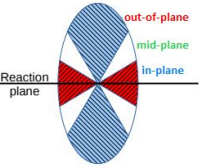
- Within uncertainties, no ordering



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Awayside yields (AS)

- Some ordering in lowest $p_{\text{T}}^{\text{assoc.}}$ bin ($< 3\sigma$)



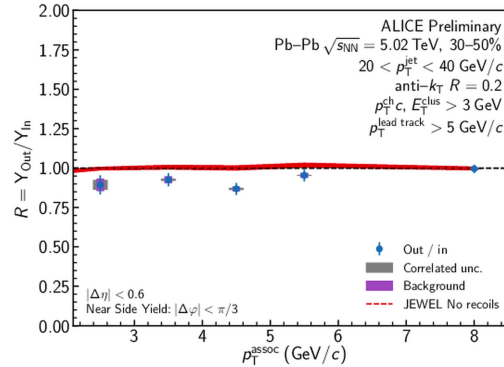
In-plane: $|\varphi_{\text{jet}} - \Psi_2| < \pi/6$
 Mid-plane: $\pi/6 < |\varphi_{\text{jet}} - \Psi_2| < \pi/3$
 Out-of-plane: $\pi/3 < |\varphi_{\text{jet}} - \Psi_2| < \pi/2$

Compare yields to each other (ratios)

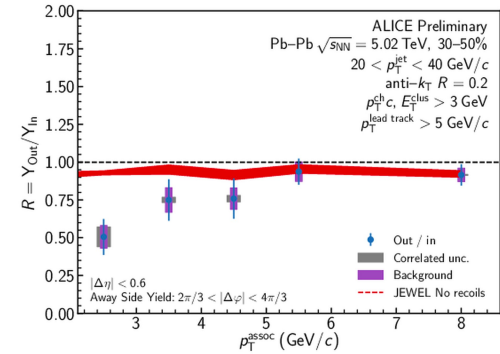
- Searching for event plane (EP) dependence
- **Out/in** and **mid/in** for NS and AS
- Within uncertainties - no EP dependence
- 3σ from unity in $2 < p_T^{\text{assoc.}} < 3$ GeV/c AS

Compare yield ratios to simulation (JEWEL)

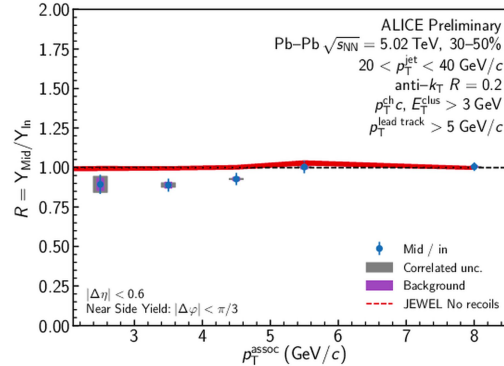
- Within uncertainties - agreement
- JEWEL with no recoils



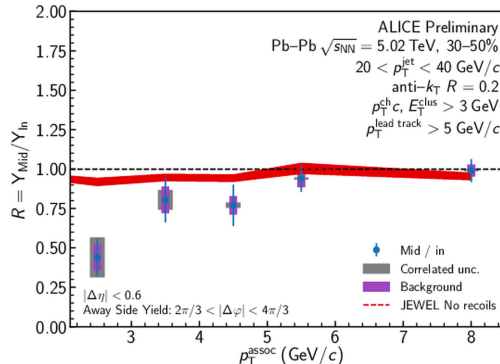
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ALI-PREL-505757



ALI-PREL-505761



ALI-PREL-505765