

# Dijet invariant mass in pp and p-Pb collisions at $\sqrt{s_{NN}} = 5.02 \text{ TeV}$

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# Dijet invariant mass in pp and p-Pb collisions at $\sqrt{s_{\text{NN}}} = 5.02$ TeV

Invariant mass definition

$$\begin{aligned} M_{\text{jj}}^2 &= (p_1 + p_2)^2 \\ &= m_1^2 + m_2^2 + 2(m_{\text{T},1} m_{\text{T},2} \cosh(\Delta y) - p_{\text{T},1} p_{\text{T},2} \cos(\Delta\phi)) \\ &\approx 2p_{\text{T},1} p_{\text{T},2} (\cosh(\Delta\eta) - \cos(\Delta\phi)). \end{aligned}$$

Background (BG) subtracted for each jet with

$$p_{\text{CORR}}^\mu = p^\mu - [(\rho + \rho_m) A_{\text{jet}}^E, \rho A_{\text{jet}}^x, \rho A_{\text{jet}}^y, (\rho + \rho_m) A_{\text{jet}}^z],$$

where  $\rho$  is estimated with sparse method<sup>1</sup>, and  $\rho_m = 0$  for  $p_{\text{T}}$ -scheme jets.

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<sup>1</sup>CMS collaboration, *JHEP*, vol. 08, p. 130, 2012. arXiv: 1207.2392 [hep-ex].

# Estimate background fluctuations with rotated cones

Instead of sparse method  $\rho$ ,  
estimate BG with

$$\rho' \equiv \sum_{\text{cone}} p_{T,i} / (\pi R^2)$$

for each cone. The  
difference reflects the BG  
fluctuations

$$\delta M_{jj} \equiv M_{jj} - M'_{jj}.$$

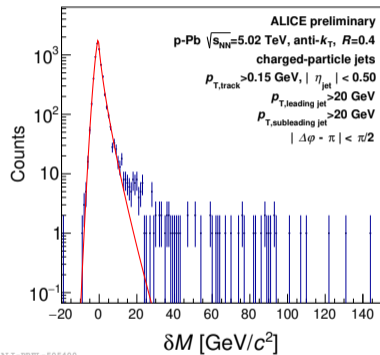
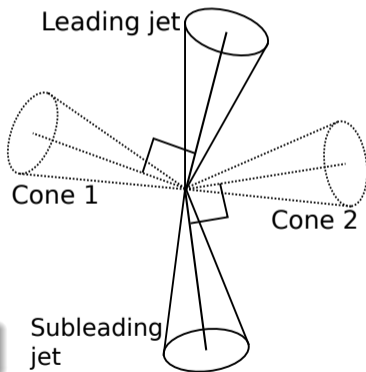


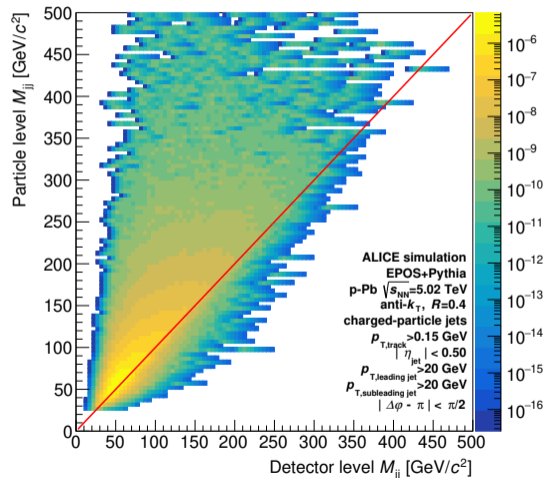
Figure: BG fluctuations of p–Pb collisions, with the peak fitted with asymmetric generalized Gaussian.

# Unfolding

- Full detector simulation for detector effects.
- Include background fluctuations with

$$U_{\text{tot}} = U_{\text{bg-fluct}} \times U_{\text{det}}.$$

- Unfold with Bayesian iterative method.
- Figure: BG fluctuations and detector effects combined for p–Pb response.

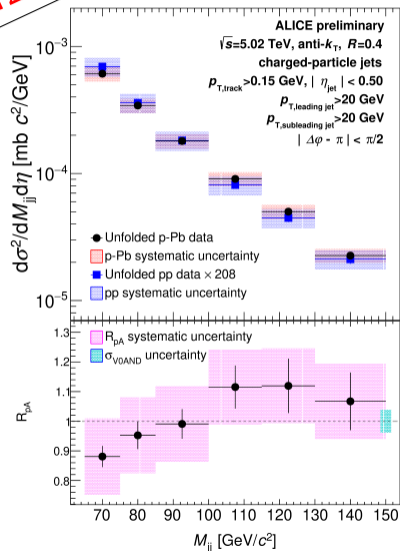


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# Results

New at QM22

- pp was measured on 2017 and p-Pb on 2016.
- Top: Dijet invariant mass in pp and p-Pb.
- Bottom: Nuclear modification factor  $R_{pA}$ .
- No significant deviation from  $R_{pA} = 1$ .
- Future plans:
  - Model comparisons to  $R_{pA}$ .
  - Later extend the analysis to Pb-Pb.



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