Recent heavy-ion results at CMS from the LHC run 2

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Please visit: https://twiki.cern.ch/twiki/bin/view/CMSPublic/PhysicsResultsHIN
Nuclear modification of heavy vs light quarks

D_0 R_{AA} up to p_T \sim 100 \text{ GeV/c!}

CMS-PAS-HIN-16-001
CMS-PAS-HIN-15-015

Comparable suppression of heavy vs light flavor
Nuclear modification of heavy vs light quarks

CMS Preliminary

$D_0 R_{AA}$ up to $p_T \sim 100 \text{ GeV/c}$!

Centrality 0-10%

Comparable suppression of heavy vs light flavor
Di-b-jet momentum imbalance

Inclusive jets

\[ x_j = \frac{p_{T,2}}{p_{T,1}} \]

Similar \( p_T \) imbalance between inclusive jet and b-jet pairs
Di-b-jet momentum imbalance

Inclusive jets

b-jets (both tagged as b-jet)

Similar $p_T$ imbalance between inclusive jet and b-jet pairs
Path-length dependence of energy loss

\[ \Delta E \sim L^{\alpha} : \]

\[ \alpha = 1 \] for QCD, collisional

\[ \alpha = 2 \] for QCD, radiative

\[ \alpha = 3 \] for AdS/CFT

CMS-PAS-HIN-15-014

CMS Preliminary

PbPb \( \sqrt{s_{NN}} = 5.02 \text{ TeV} \)

\( v_2^{\{\text{SP}\}} \)

\( v_3^{\{\text{SP}\}} \)
Jet substructure
Jet substructure

Two coherent emitters?
Jet substructure

Small $z_g$

Large $z_g$

Momentum sharing between two subjets

$$z_g = \frac{\min(p_{T,1}, p_{T,2})}{p_{T,1} + p_{T,2}} < 0.5$$

Two coherent emitters?
Jet substructure

Small $z_g$

Large $z_g$

Momentum sharing between two subjets

Two coherent emitters?

$z_g = \frac{\min(p_{T,1}, p_{T,2})}{p_{T,1} + p_{T,2}} < 0.5$

Centrality: 0-10%

- pp smeared
- PbPb

anti-$k_T$ $R=0.4$

$160 < p_{T,\text{jet}} < 180$ GeV

$|\eta_{\text{jet}}| < 1.3$

CMS-PAS-HIN-16-006
Jet substructure

Small $z_g$

Large $z_g$

Momentum sharing between two subjets

$$z_g = \frac{\min(p_{T,1}, p_{T,2})}{p_{T,1} + p_{T,2}} < 0.5$$

Two coherent emitters?

PbPb/pp

Centrality: 0-10%

Anti-$k_T$ $R=0.4$

$160 < p_{T,jet} < 180$ GeV

$|\eta_{jet}| < 1.3$

$\sqrt{s_{NN}} = 5.02$ TeV

pp $25.8$ pb$^{-1}$

PbPb $404$ $\mu$b$^{-1}$

Centrality: 10-30%

SoftDrop $\beta=0$

$z_{cut}=0.1$

$\Delta R_{12}>0.1$

Centrality: 30-50%

CMS Preliminary

Centrality: 50-80%

$\sqrt{s_{NN}} = \ldots$
Backups