Measurement of $J/\psi$ production in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV by the STAR experiment

Xinjie Huang (Tsinghua University) on behalf of the STAR Collaboration
The STAR detector

- **TPC**: measure momentum and energy loss.
- **TOF**: measure time-of-flight.
- **MTD (|η|<0.5)**: identify and trigger on muons:
  - fully installed in 2014 behind magnet
  - Precise timing measurement (σ~100 ps)
  - Hit position measurement (σ~1 cm)

- Muon identification: based on energy loss measured by TPC and the position/time differences between MTD measurements and TPC track projection.
$J/\psi$ yield and $v_2$

- ~25000 $J/\psi$ from Run14 MTD triggered data

- $J/\psi$ invariant yield vs. $p_T$:
  - consistent with the published di-electron channel results.
  - well described by Tsallis Blast-Wave (TBW) function assuming zero $J/\psi$ velocity.

- $J/\psi$ $v_2$:
  - consistent with zero within uncertainties for $p_T > 2\text{GeV/c}$, favoring small contribution from regeneration of thermalized charm quarks.

References:

TBW: Z. Tang et al., PRC 79,051901(2009)
**Strong suppression at low** $p_T$: dissociation and CNM effects.

**Strong suppression at high** $p_T$ in central collisions: a clear signal of dissociation.

**Rising $R_{AA}$ with $p_T$ in 20 - 60% centrality: formation time effects and B-hadron feed-down.**

Less suppression at LHC at low $p_T$ in central collisions: larger regeneration contribution due to higher charm quark production cross-section.

Stronger suppression at LHC at high $p_T$ in central collisions: larger dissociation rate due to higher medium temperature.

$J/\psi$ $R_{AA}$ can be qualitatively described by both transport models including dissociation and regeneration effects. However, there is tension at high $p_T$. 

2016/9/27

Xinjie Huang, Hard Probe 2016, Wuhan