

p - E^- correlation in Au+Au collisions at 3GeV

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Supplements:

https://drupal.star.bnl.gov/STAR/system/files/yingjie_20220217_3GeV_pXi.pdf

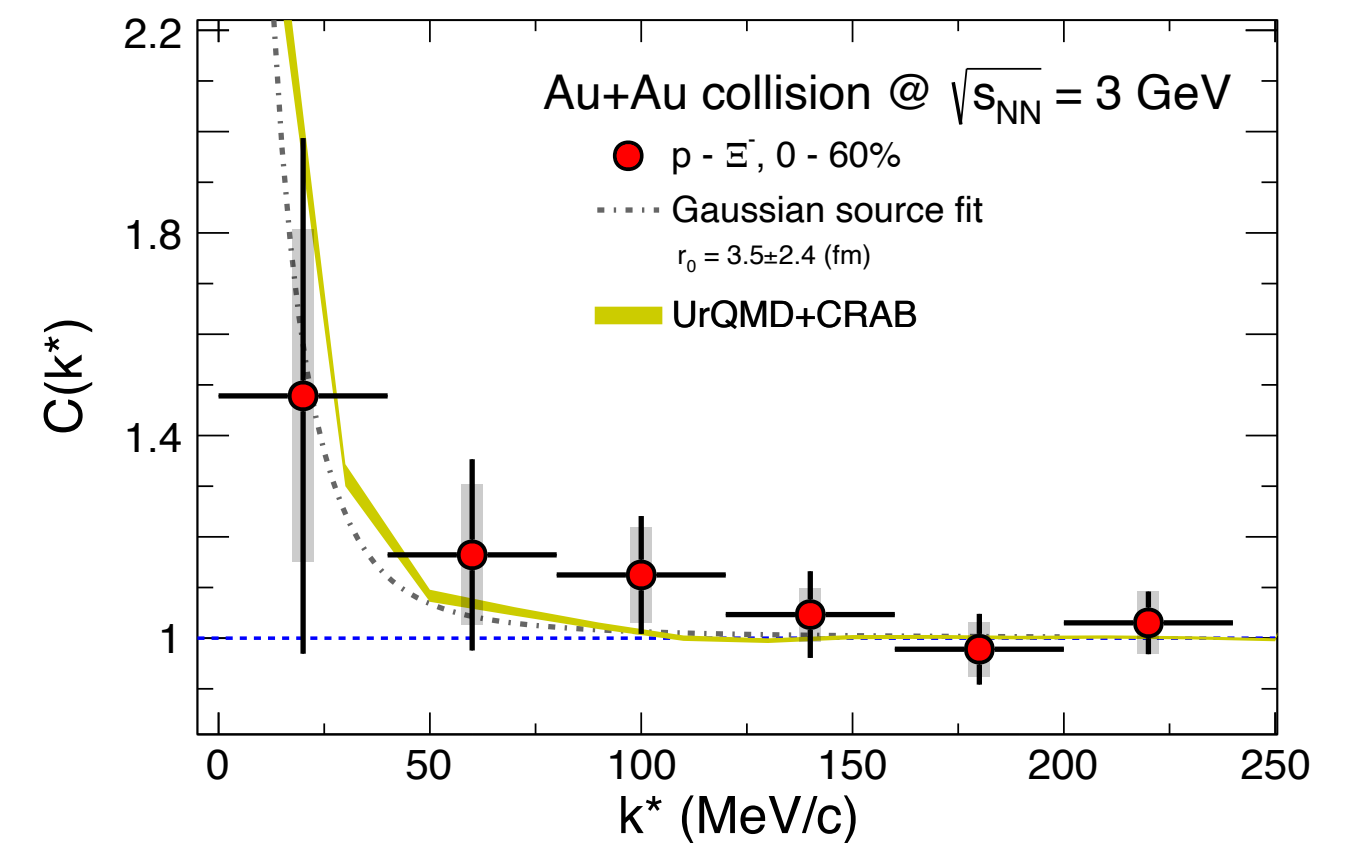
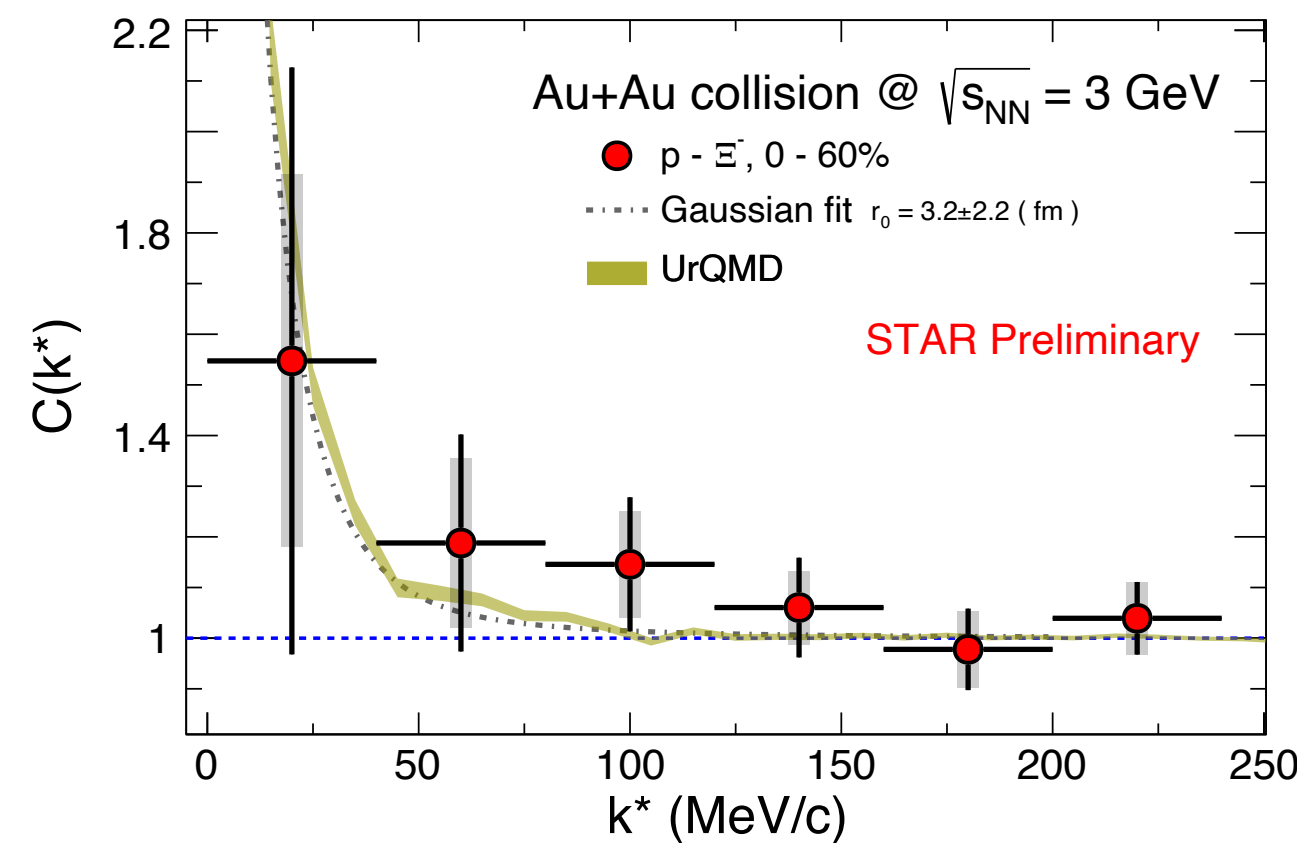
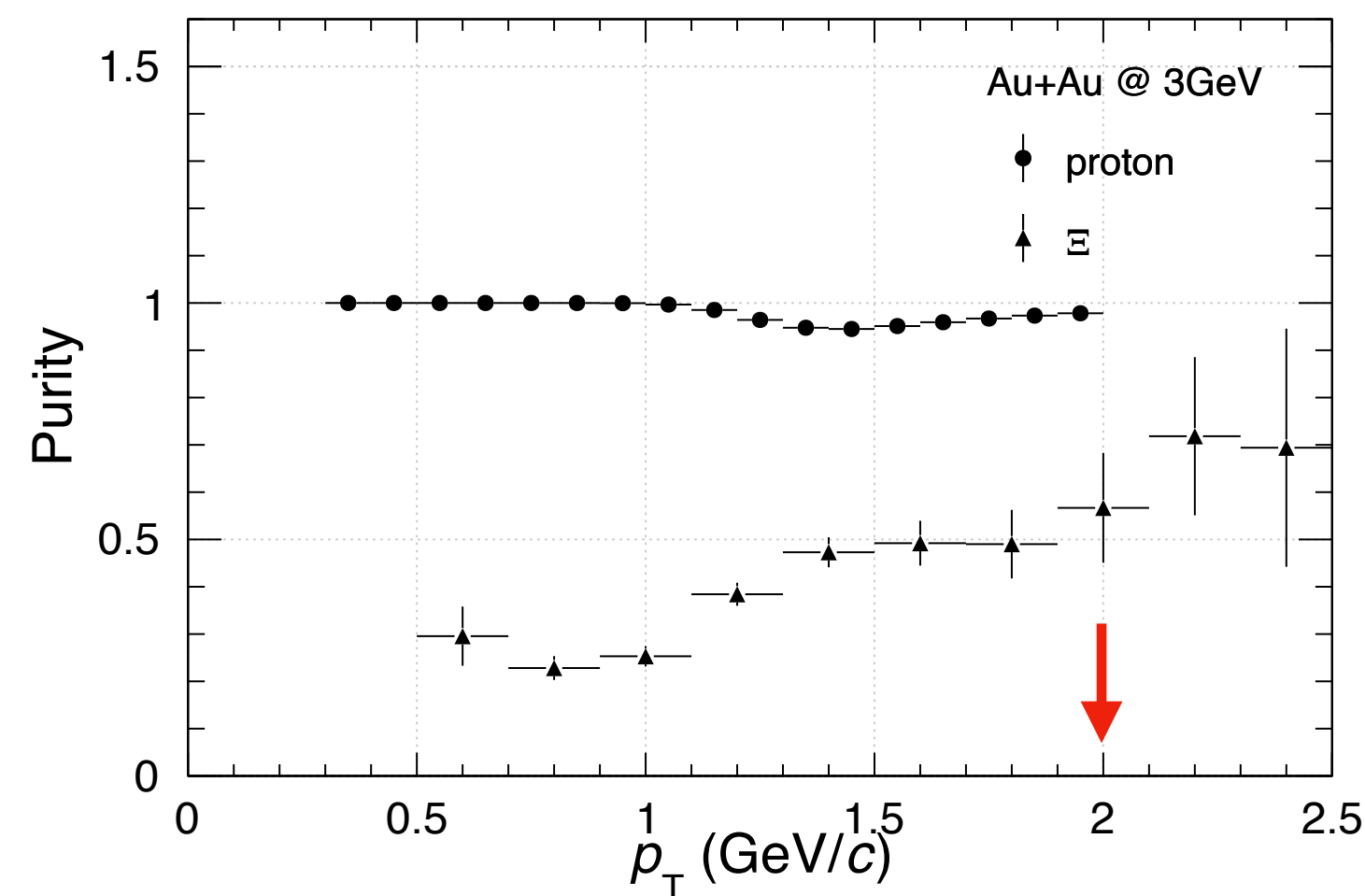
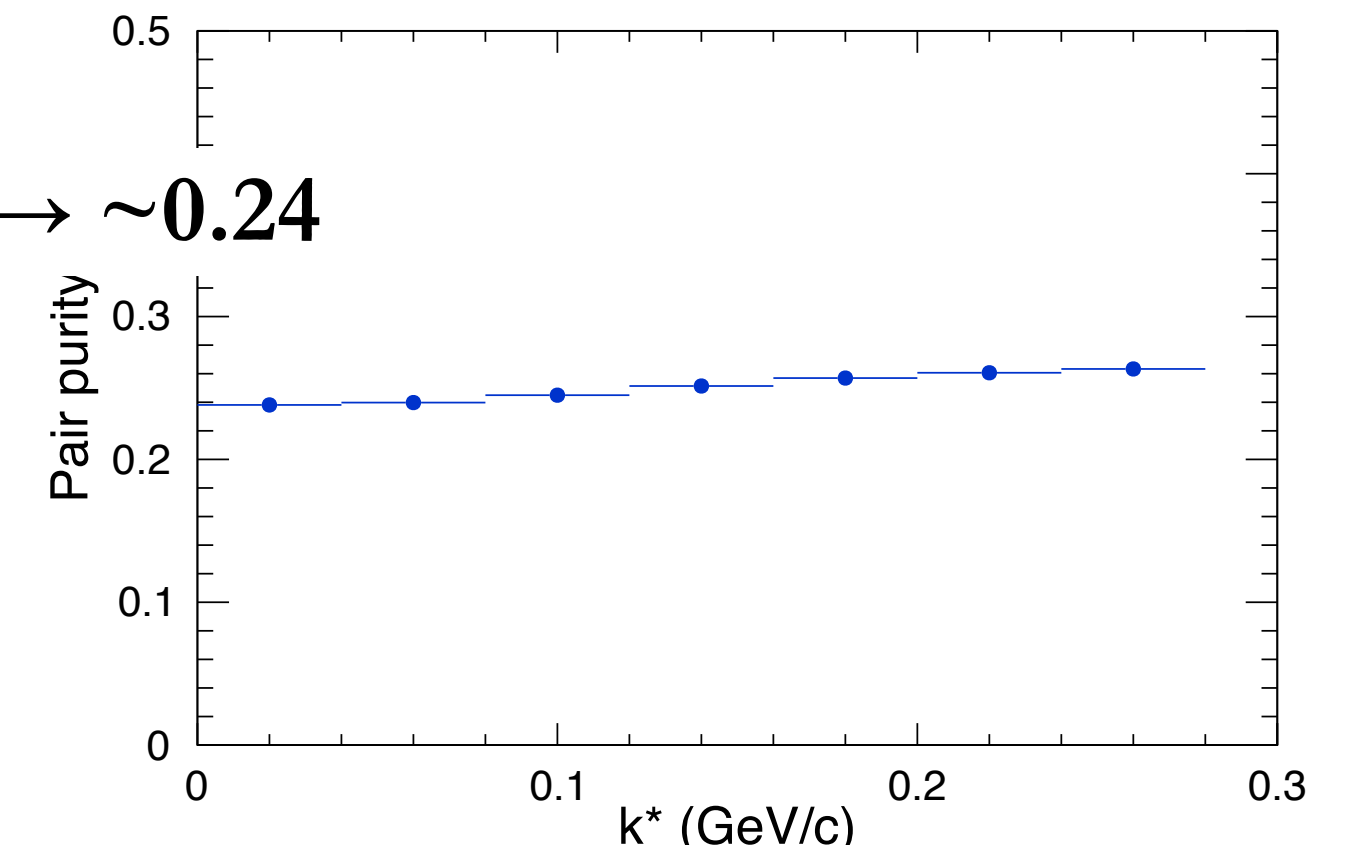
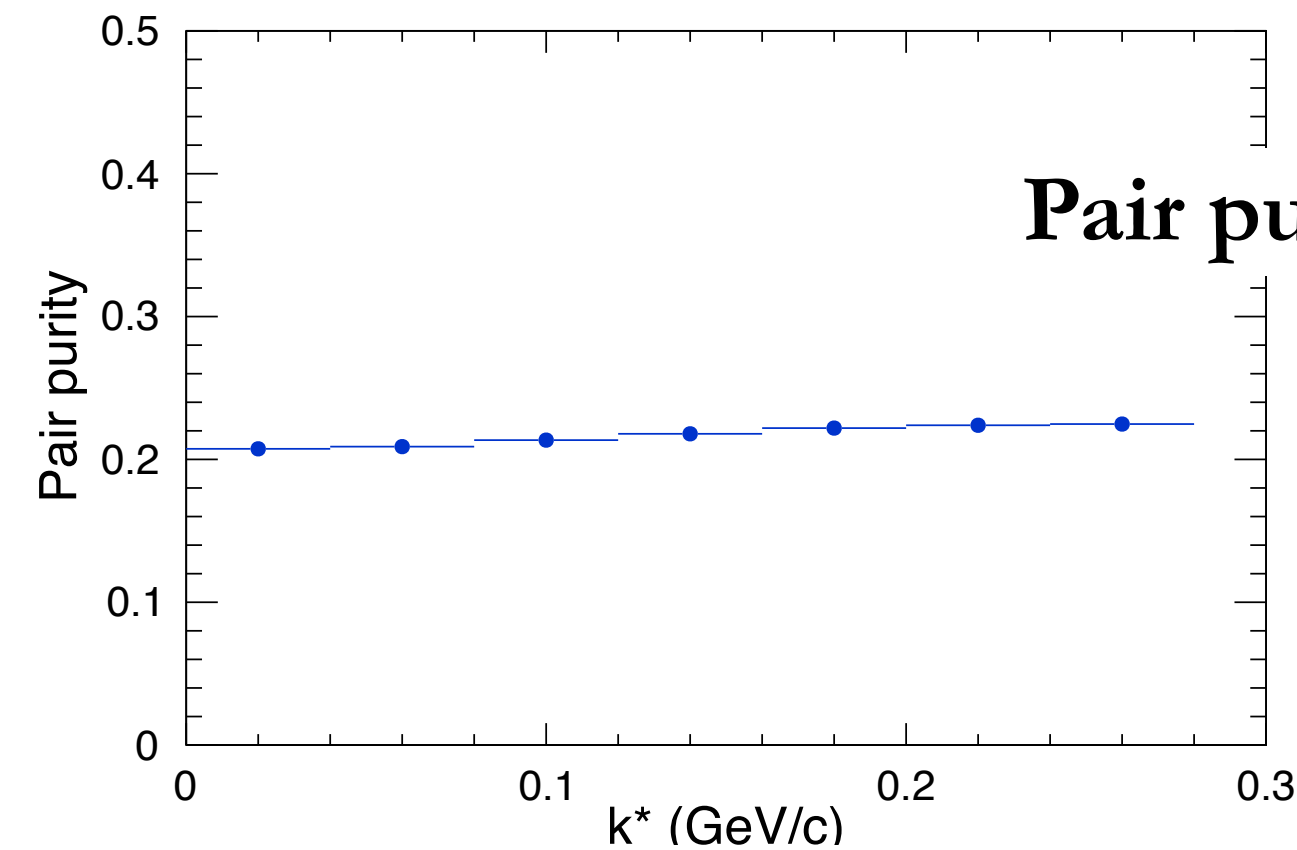
https://drupal.star.bnl.gov/STAR/system/files/yingjie_20220317_3GeV_pXi_v1_0.pdf

p- Ξ^- correlation

$$C_{\text{genuine}}(k^*) = \frac{C_{\text{raw}}(k^*) - (1 + \lambda_{\text{sideband}} \cdot (C_{\text{sideband}}(k^*) - 1))}{\lambda_{\text{genuine}}} + 1$$

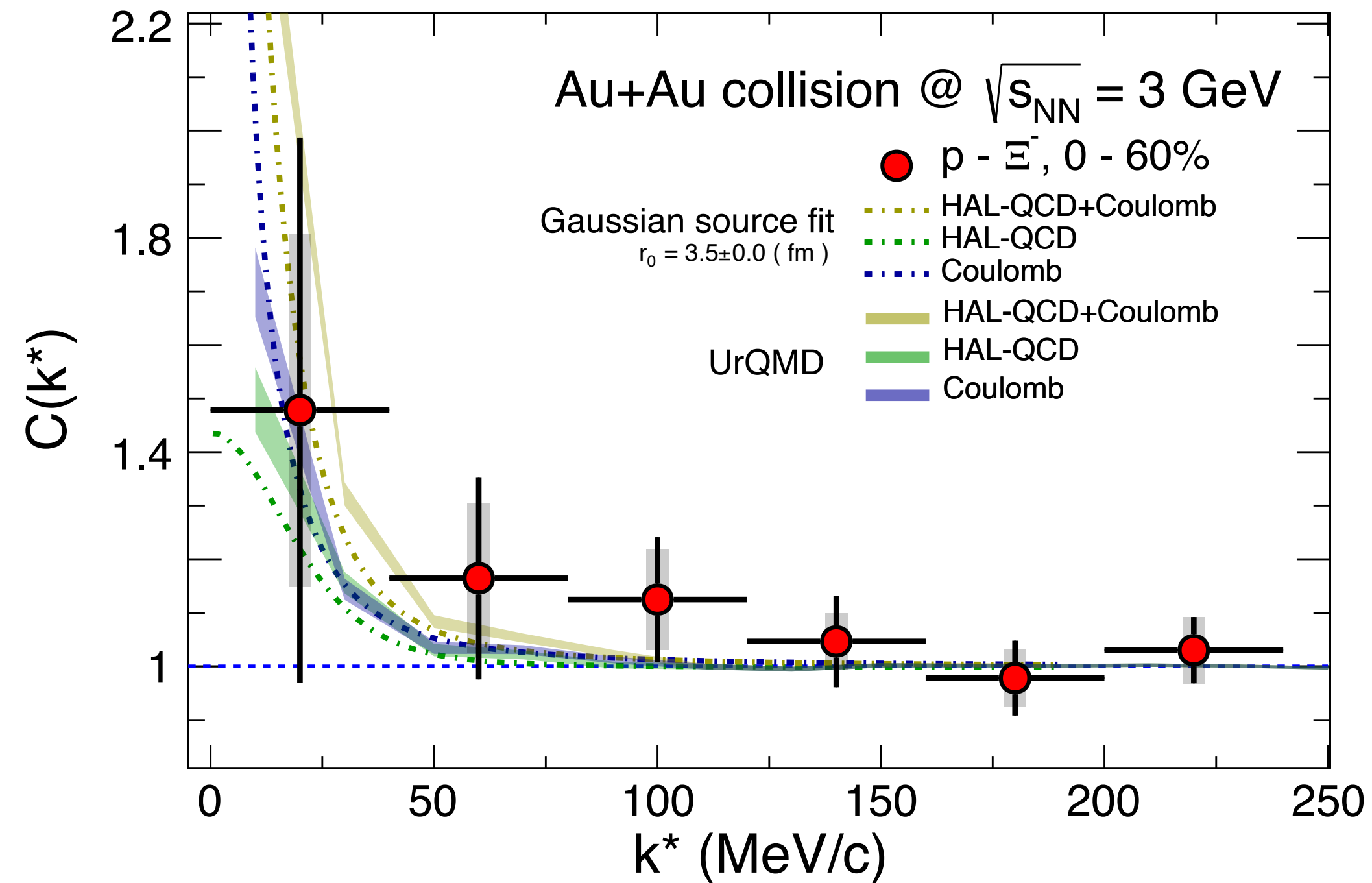
$$\lambda_{\text{genuine}} = \text{proton purity} * \Xi^- \text{ purity} * \text{proton primordial fraction} * \Xi^- \text{ primordial fraction}$$

- After the last presentation, I rechecked the full analysis codes and find a code bug: didn't set proton purity = 1 when $p > 2 \text{ GeV}/c$ (using $\text{tof } m^2$ cut, purity = 1) but let it be 0 \Rightarrow scale factor λ_{genuine} will become smaller $\Rightarrow C_{\text{genuine}}(k^*)$ will become larger



After correction, CF decreased $\sim 4.5\%$

p- Ξ^- correlation



- Compare three different cases: QCD+Coulomb, QCD only, Coulomb only
 - Data cannot discriminate them now
 - 2B Au+Au events at $\sqrt{s_{NN}} = 3$ GeV collected in 2021, expected to reduce uncertainty by a factor of 3

Summary

- Add a Gaussian source fit using CATS+HAL QCD
- Rechecked the analysis codes, results differ from the last presentation by 4.5% due to incorrect purity calculation
- Want to replace the approved preliminary plot with the updated one as below

