

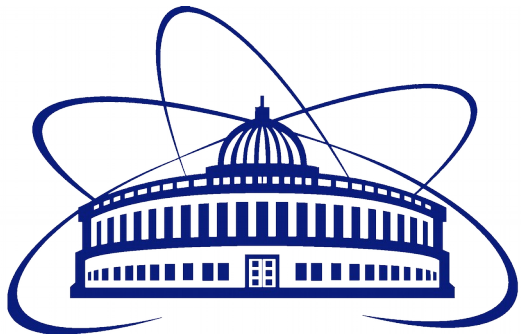
Status of the study of global polarization at MPD

Elizaveta Nazarova¹

MPD Polarization Meeting «Vorticity and Polarization in Heavy-Ion Collisions»

13.07.2021

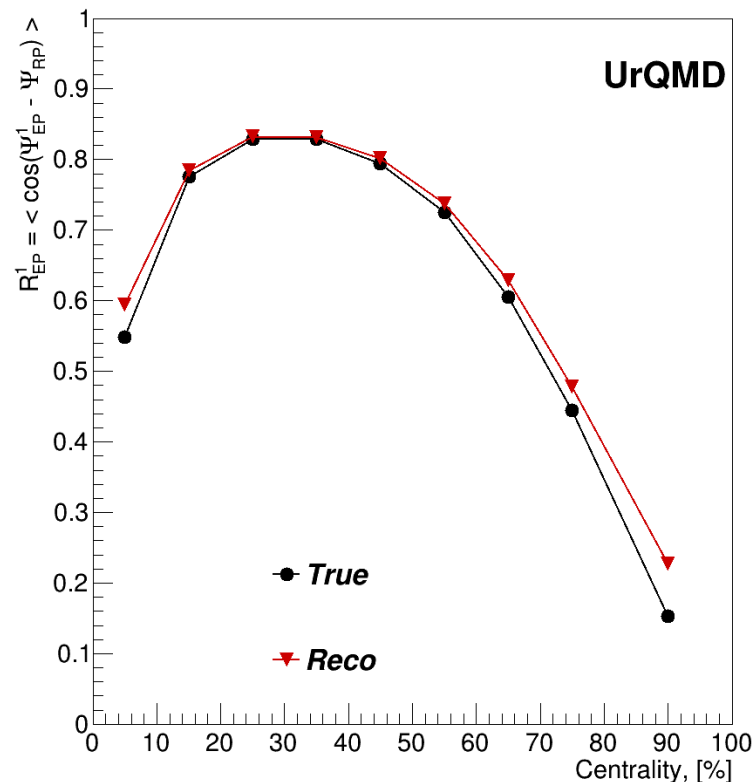
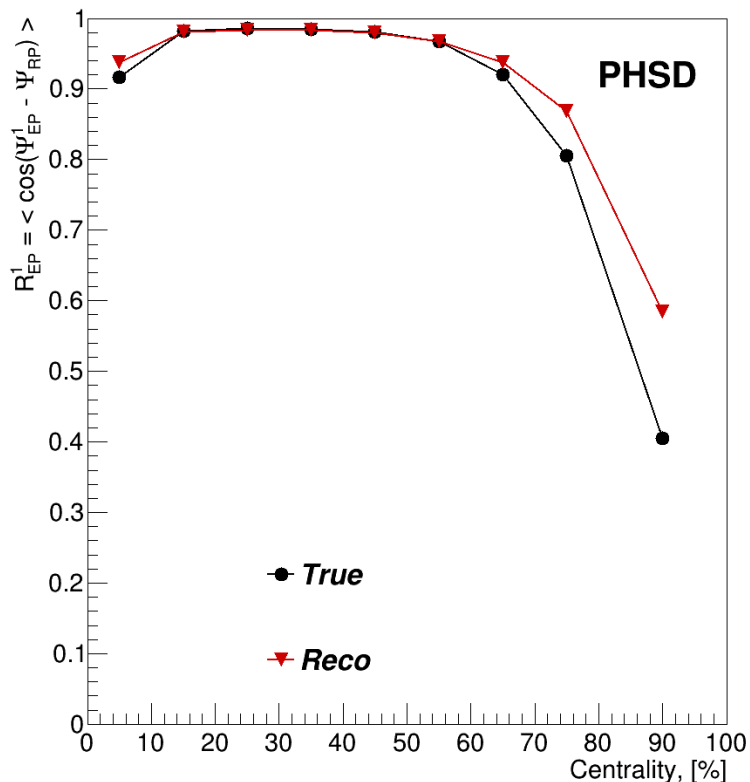
¹ Joint Institute of Nuclear Research, Dubna, Russia





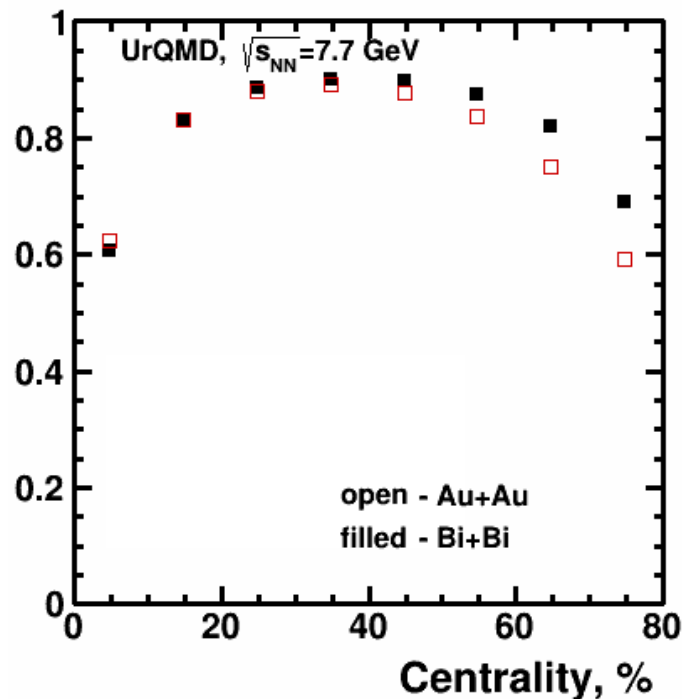
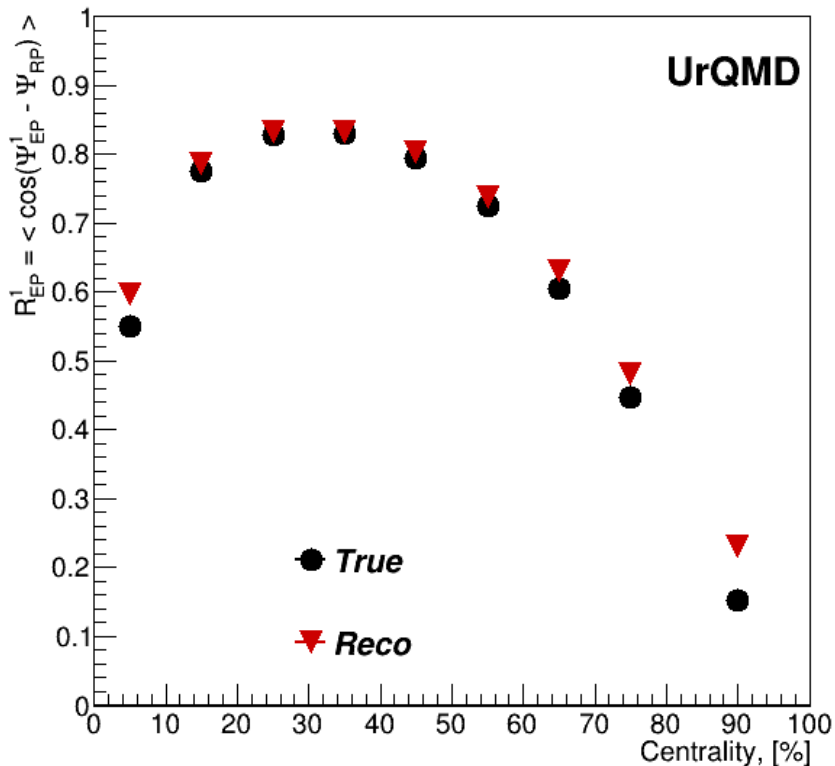
- PHSD dataset
 - Rerun the simulation with the new transfer of polarization to the secondary Lambda*
- Event plane resolution and Pseudorapidity distributions
 - Comparison with UrQMD model

* Ξ^{+-} , Ξ^0 , Σ^0 decays



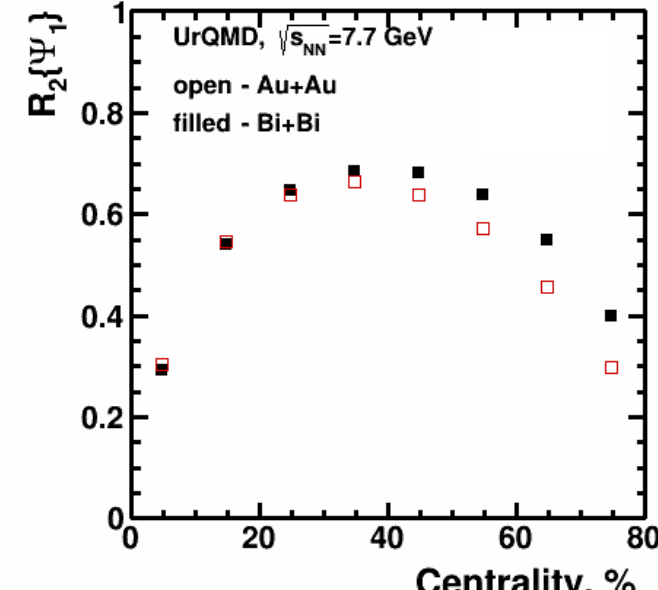
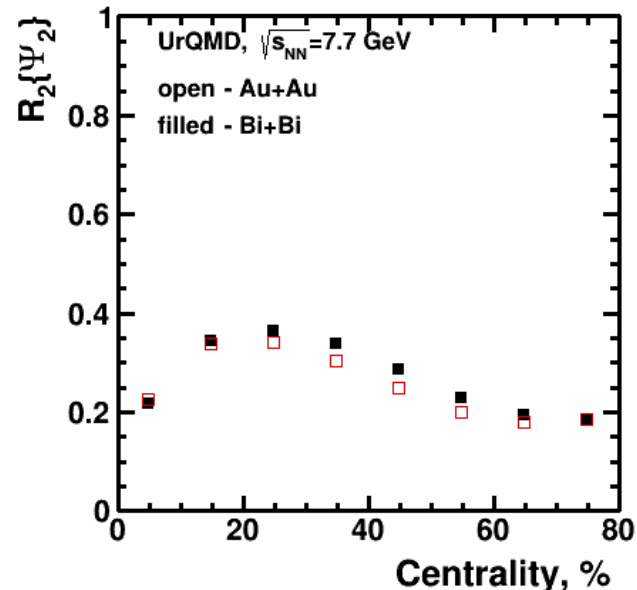
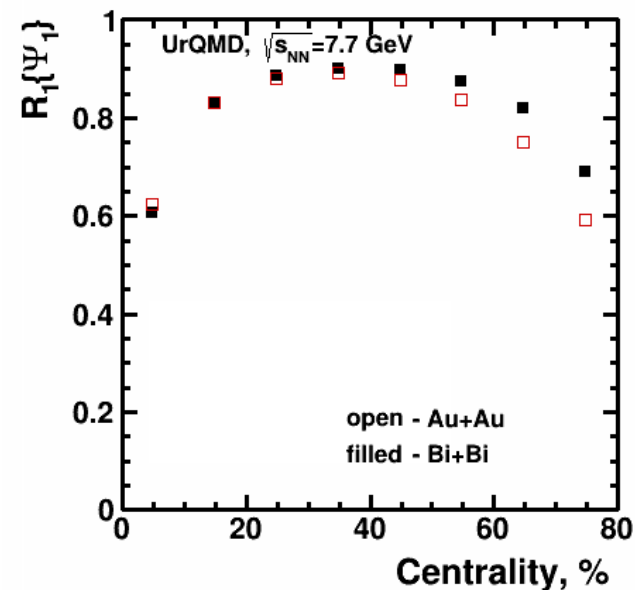
- Comparison with UrQMD model
 - UrQMD gives expected result
 - What is happening in PHSD?

Request 9 (UrQMD AuAu 7.7 GeV, used 1.4M events to have the same statistics)

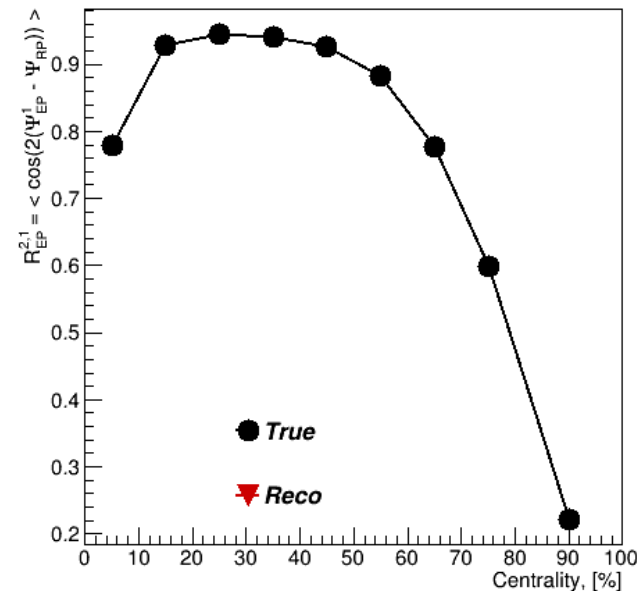
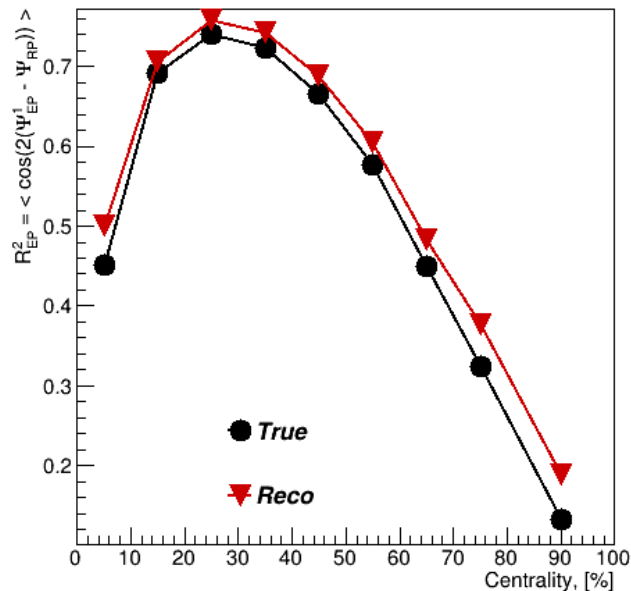
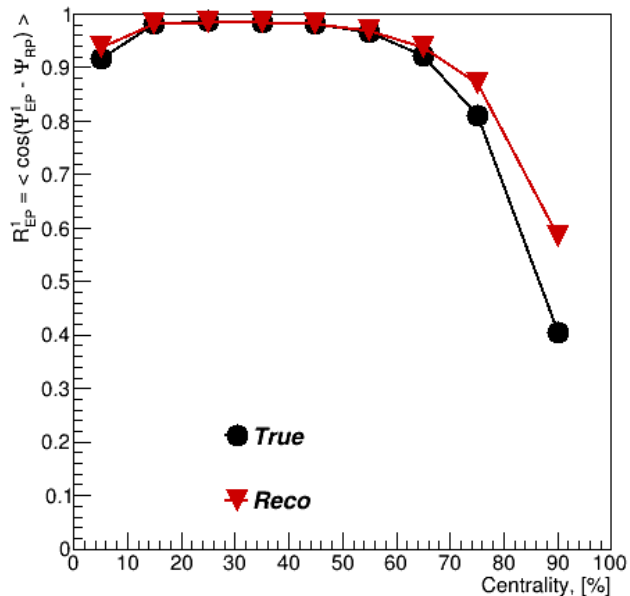


- Comparison with result by P. Parfenov
 - Similar results
 - Different number of events and centrality definition
 - For an exact comparison need to rerun with the same parameters

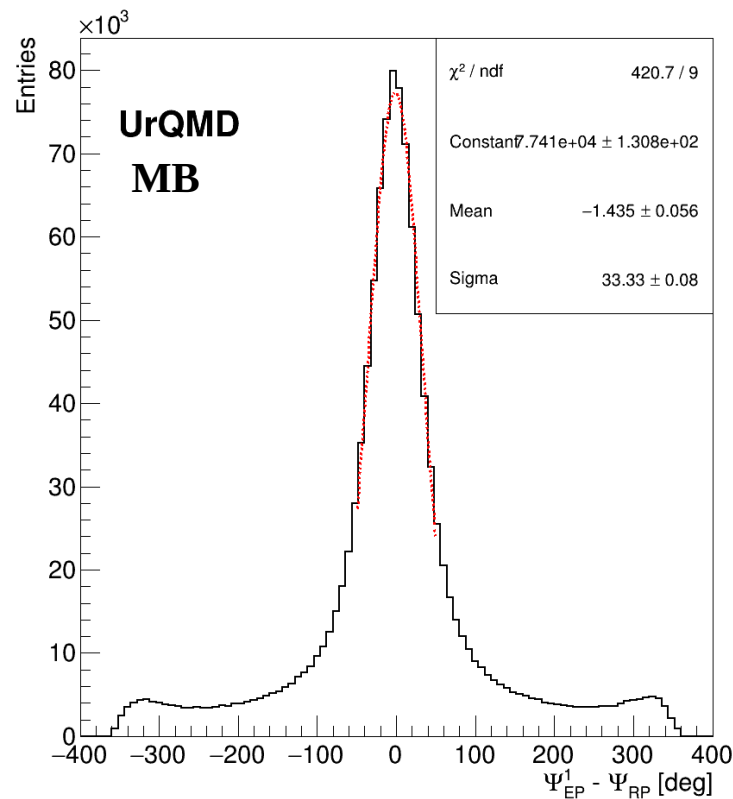
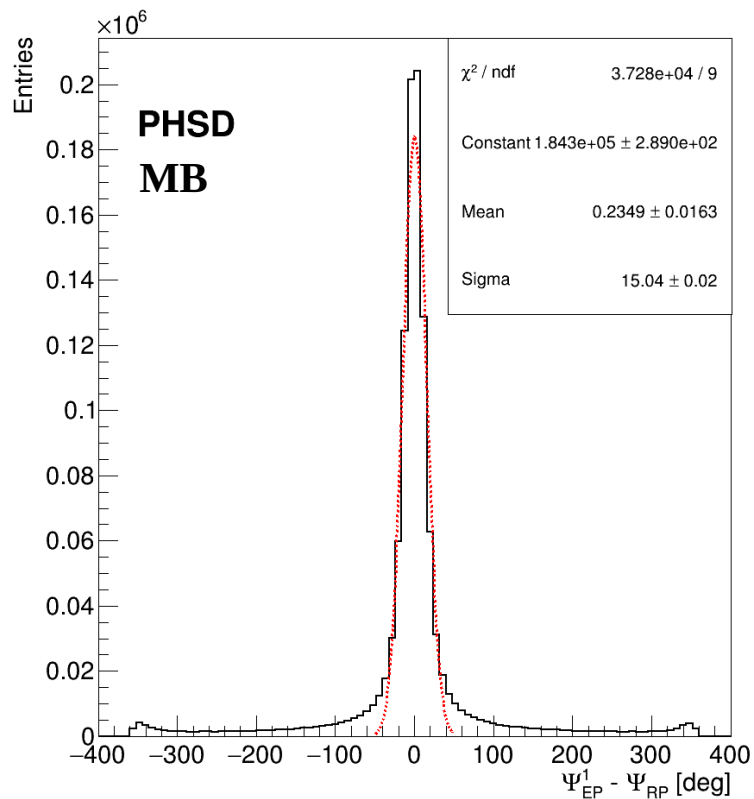
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Resolutions for UrQMD dataset by P. Parfenov
($R_1(\Psi_1)$, $R_2(\Psi_2)$, $R_2(\Psi_1)$)

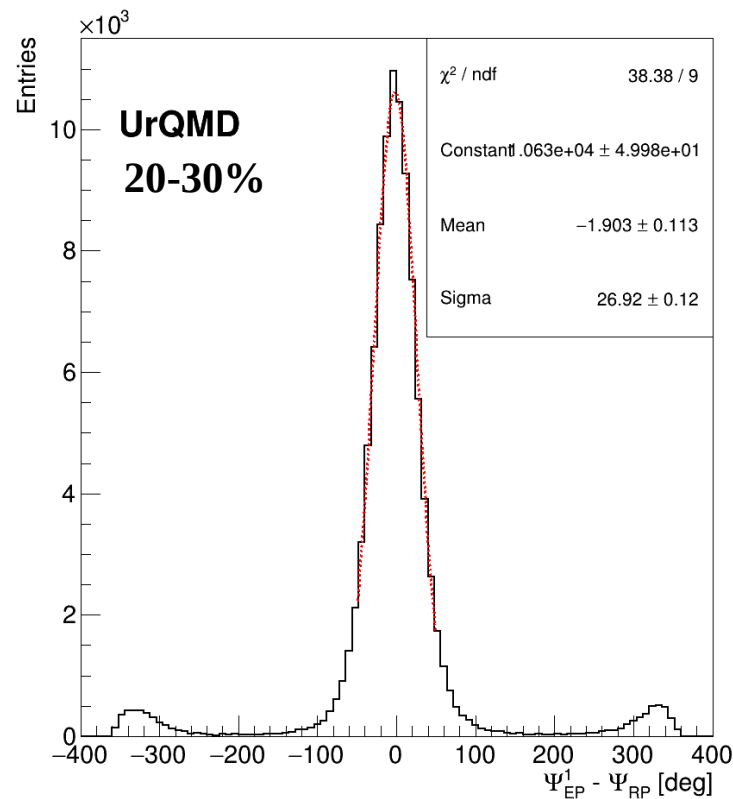
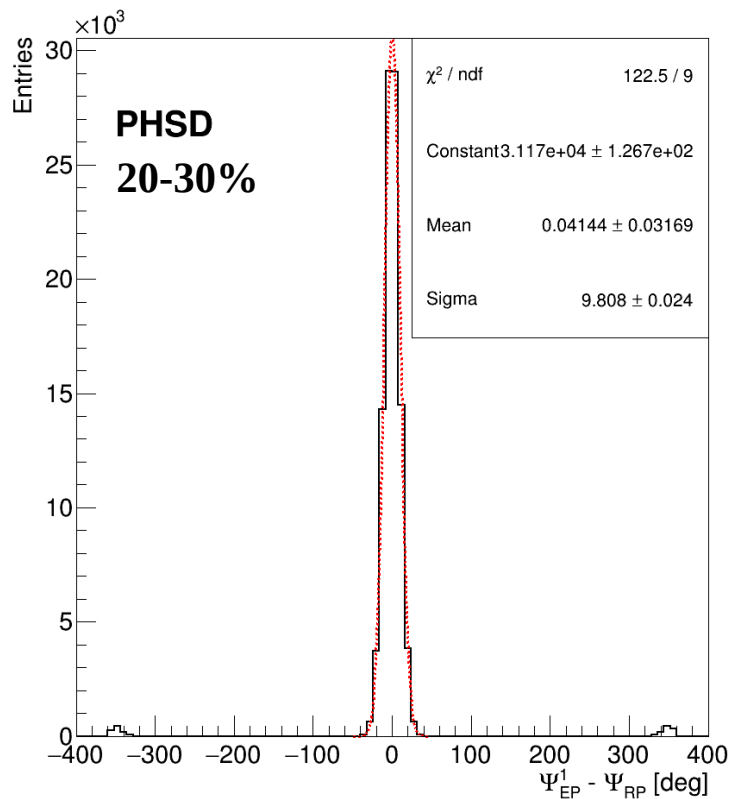


Resolutions for PHSD dataset
 ($R_1(\Psi_1)$, $R_2(\Psi_2)$, $R_2(\Psi_1)$)



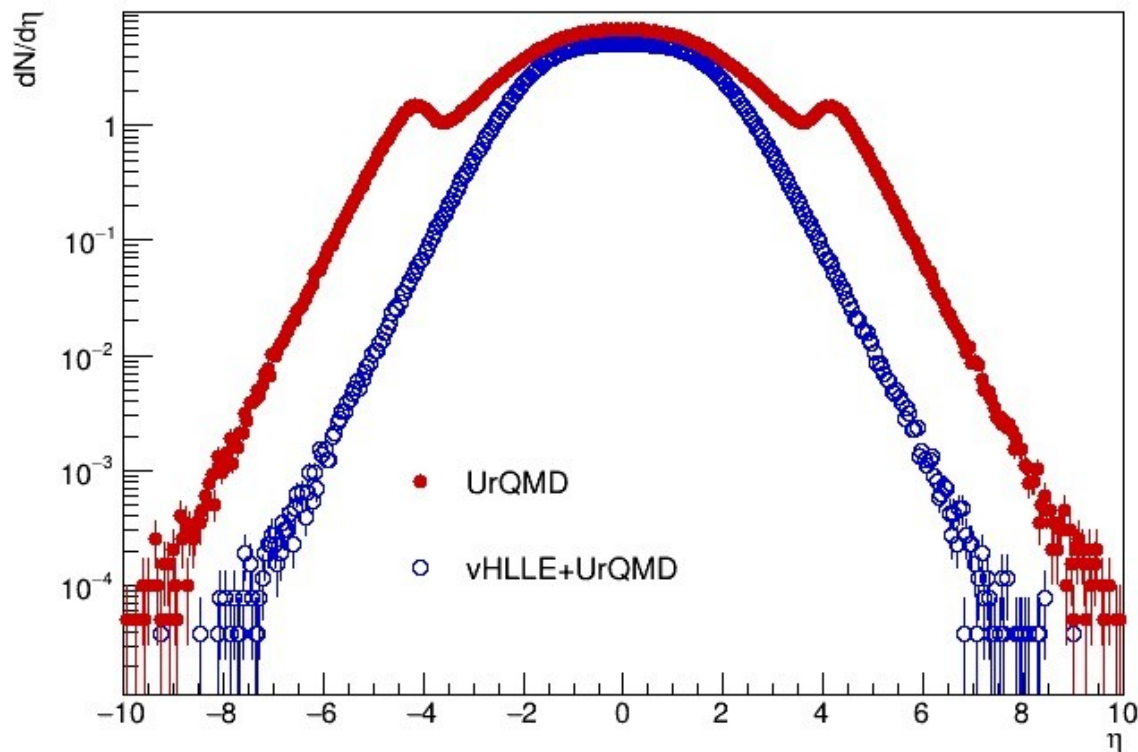
- Comparison of the difference between EP_1 and RP

- Gaussian fit
- Resolution of ~ 33 deg. for UrQMD and ~ 15 deg. for PHSD



- Comparison of the difference between EP_1 and RP
 - Gaussian fit
 - Resolution of ~ 33 deg. for UrQMD and ~ 15 deg. for PHSD

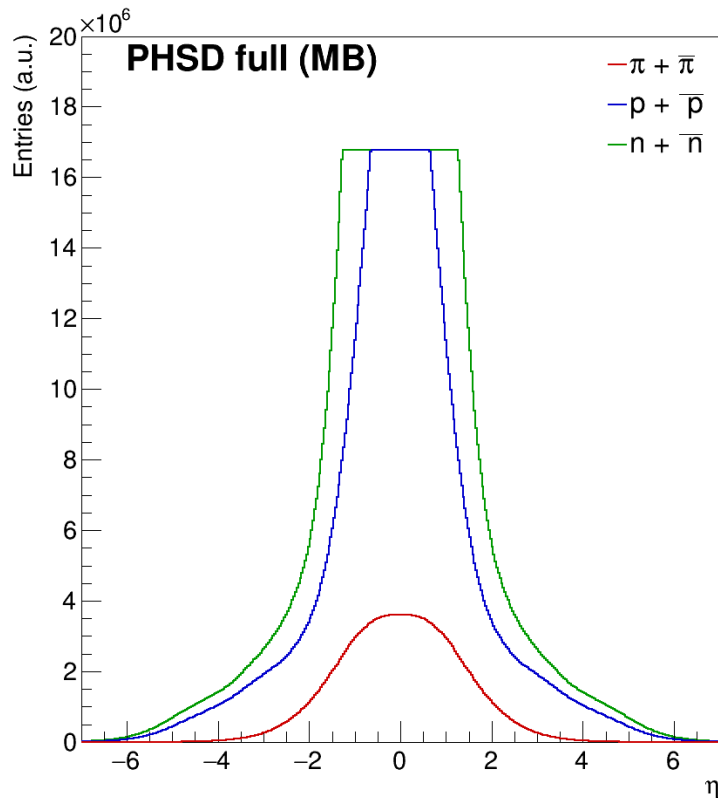
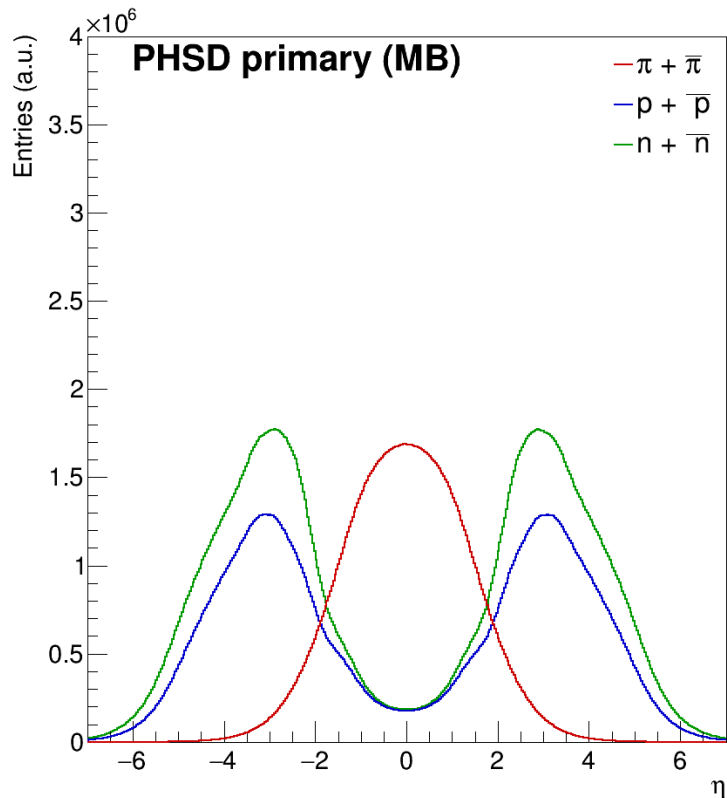
Au+Au $\sqrt{s_{NN}} = 11.5$ GeV, 20-30%, charged hadrons



- Comparison of UrQMD and vHLLE+UrQMD models

- Low multiplicity in the FHCAL region
- May affect the 1st order EP determination

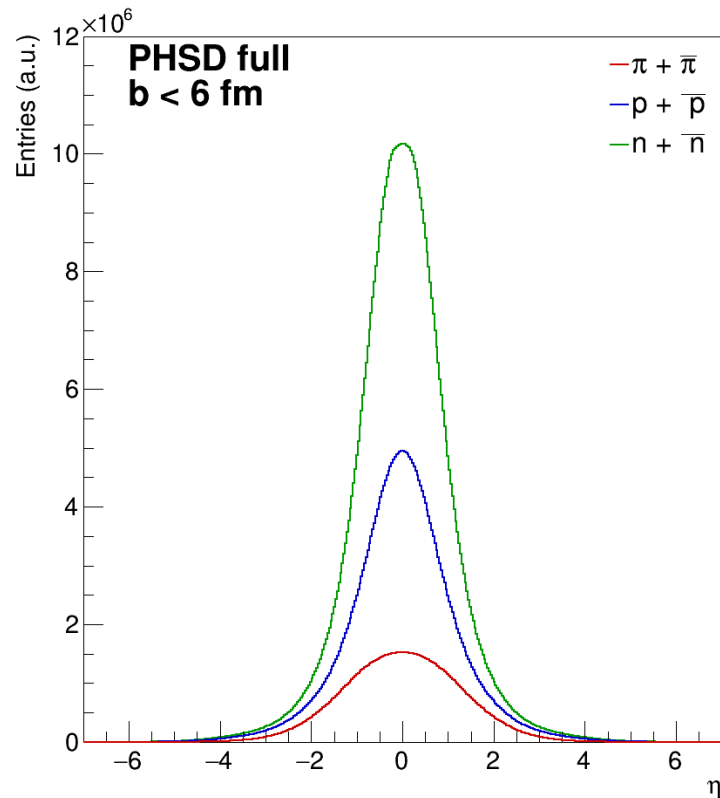
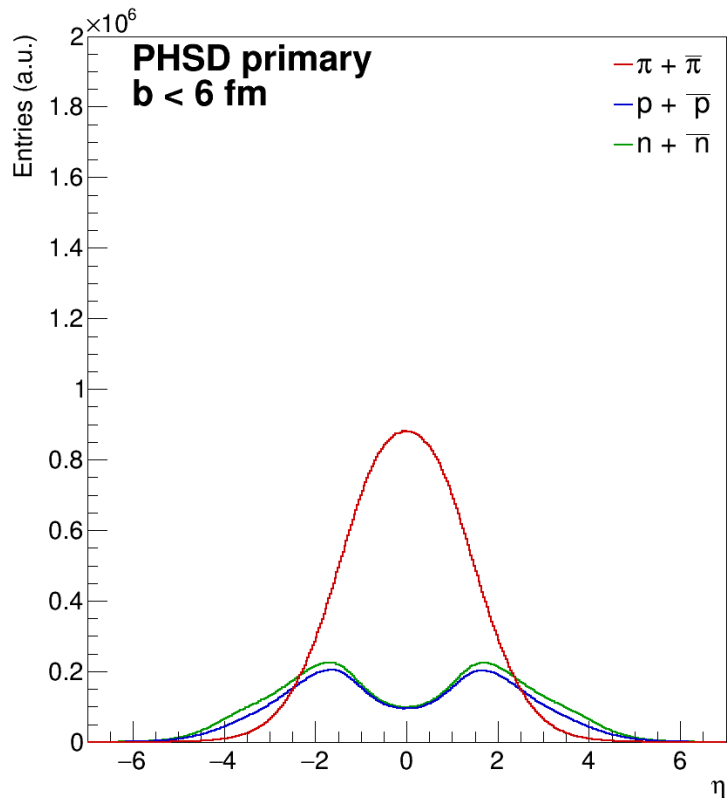
Taken from talk by P. Parfenov at PWG3 meeting (<https://indico.jinr.ru/event/2202/>)



● PHSD model

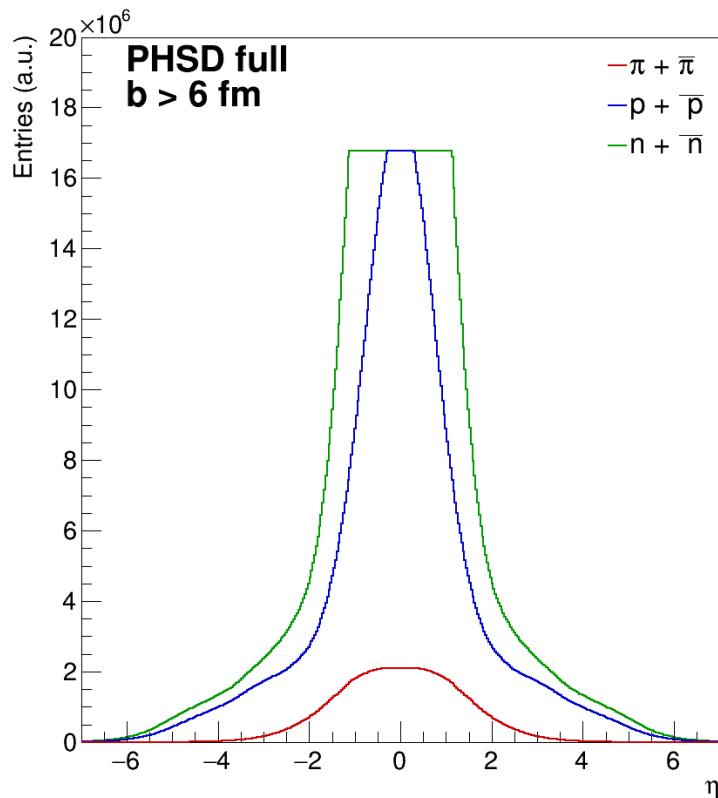
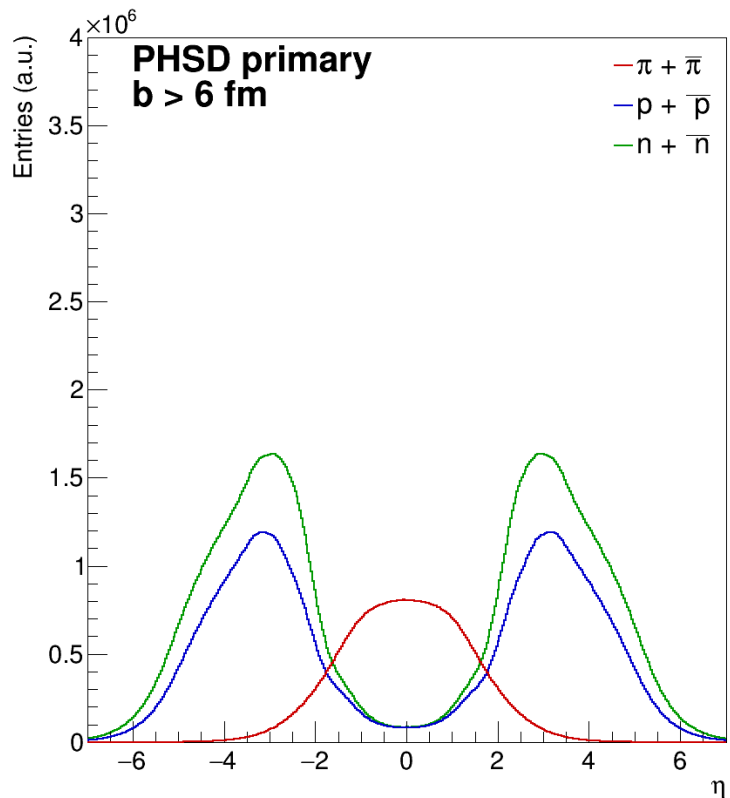
- GEANT 3
- AuAu @7.7GeV
- MCTracks (full and primary)
- $2 < |\eta| < 5$ corresponds to FHCaI

Spectator peaks seem to disappear during simulation



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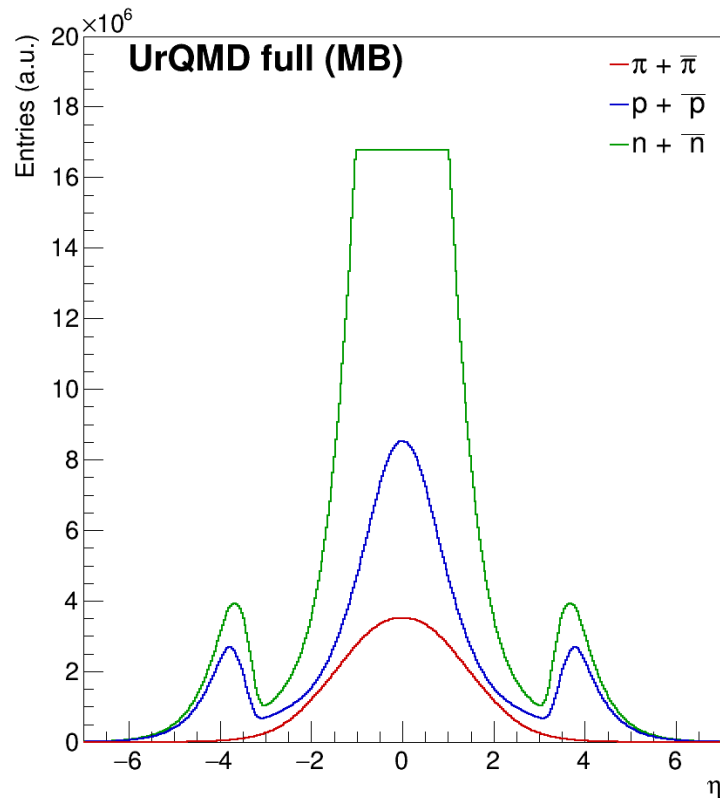
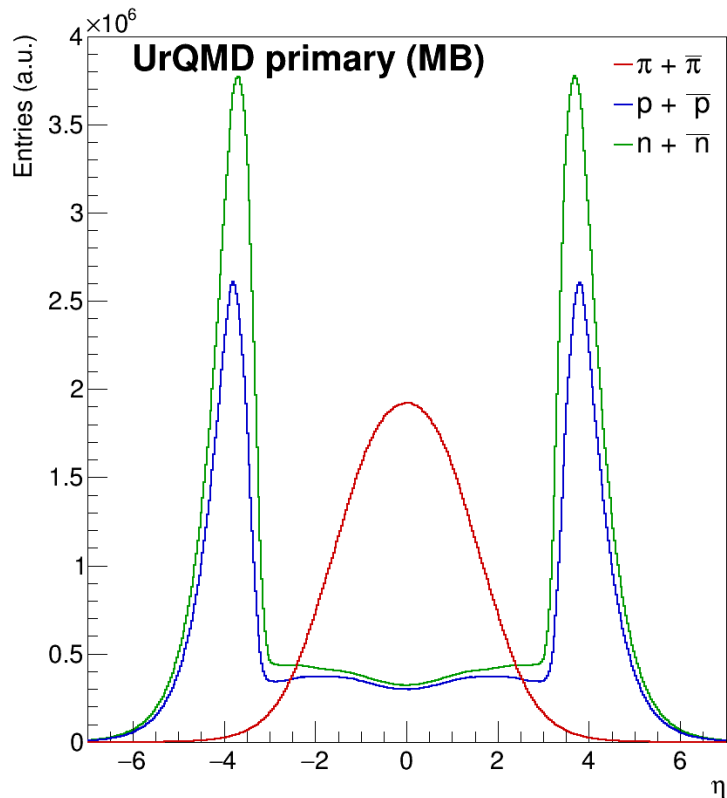
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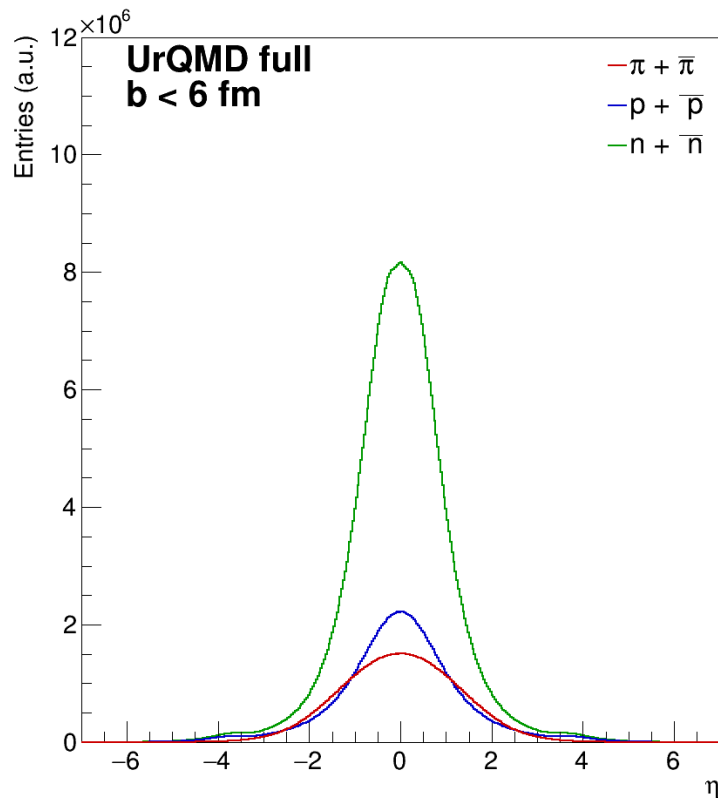
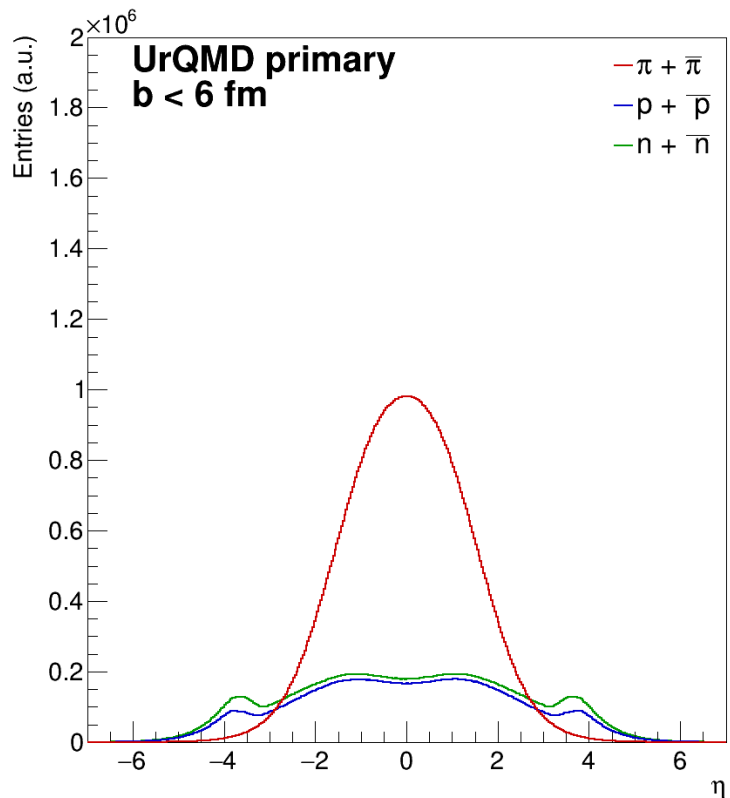
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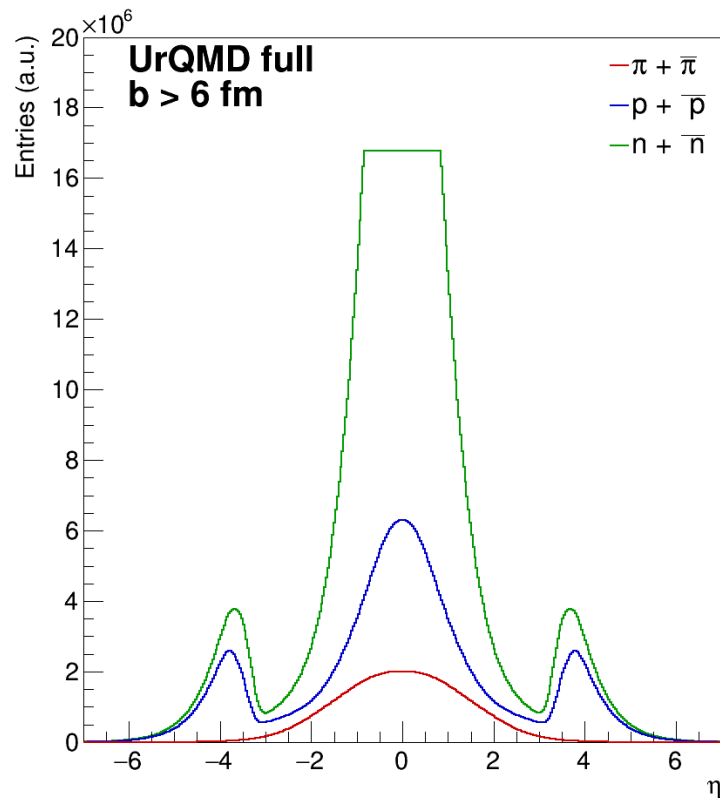
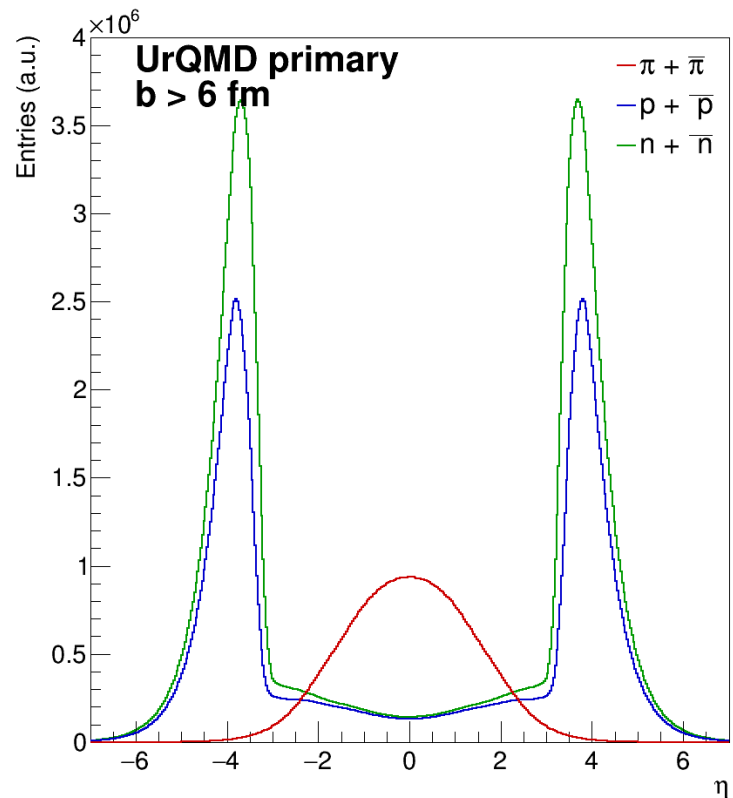
- UrQMD model
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Spectator peaks visible after simulation



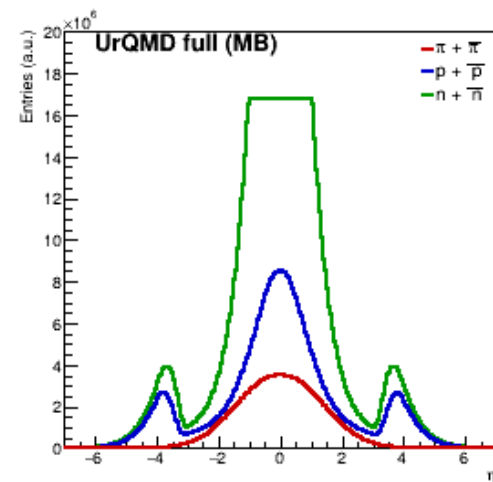
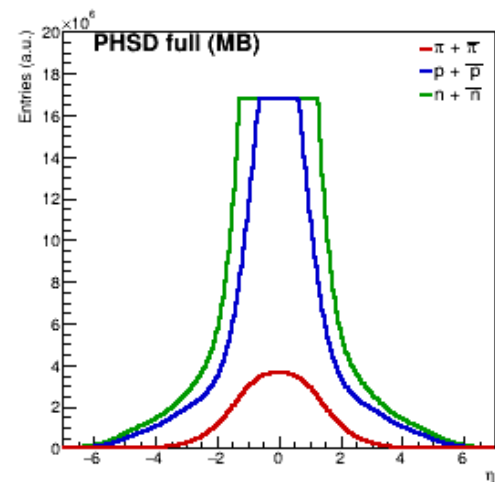
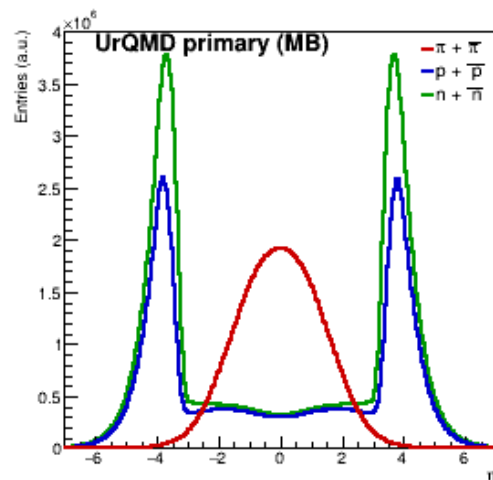
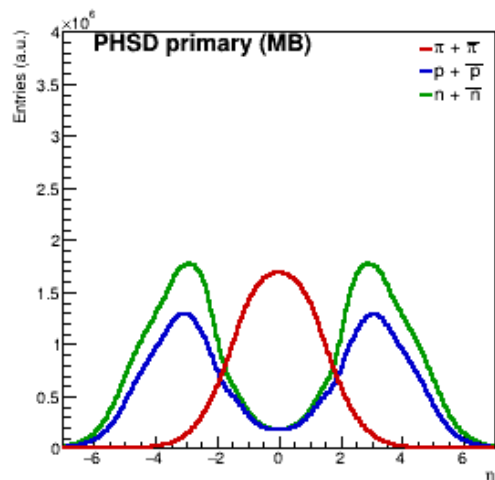
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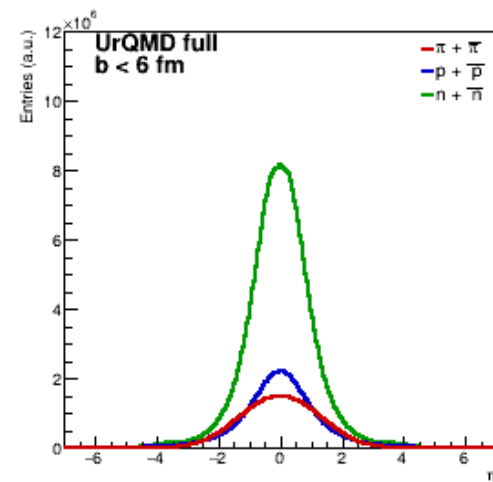
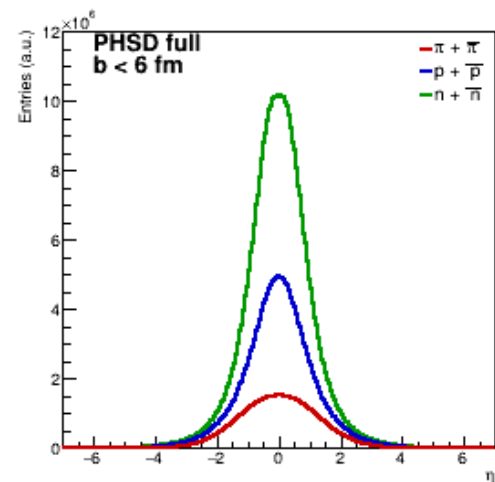
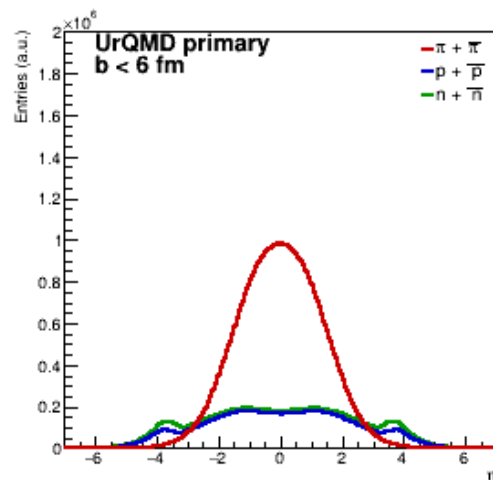
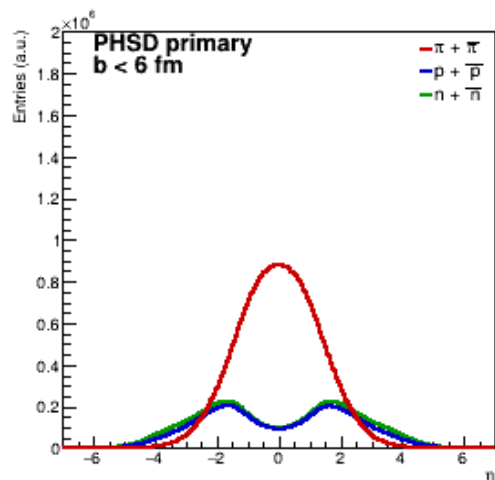
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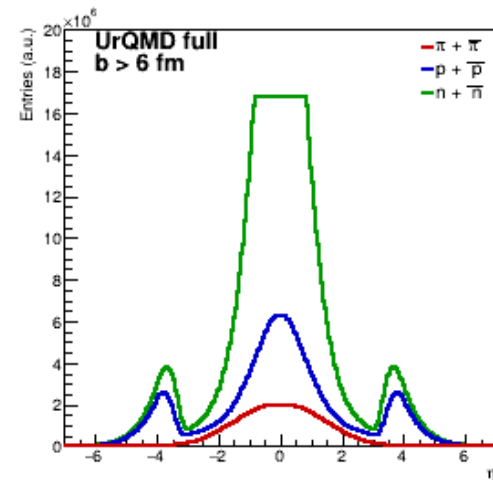
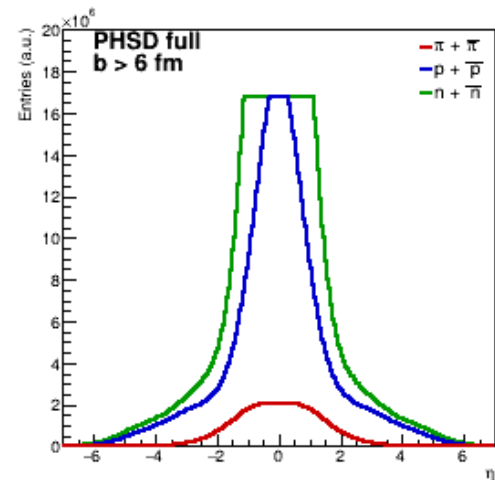
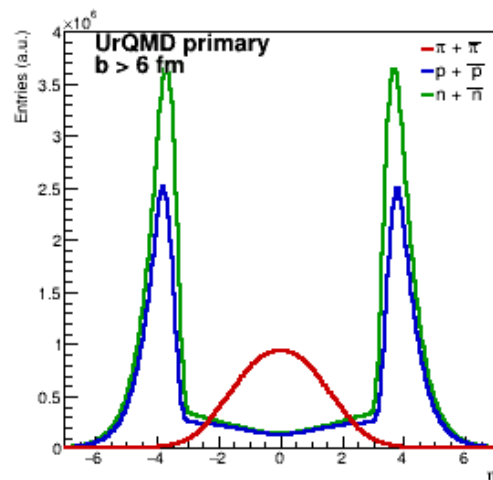
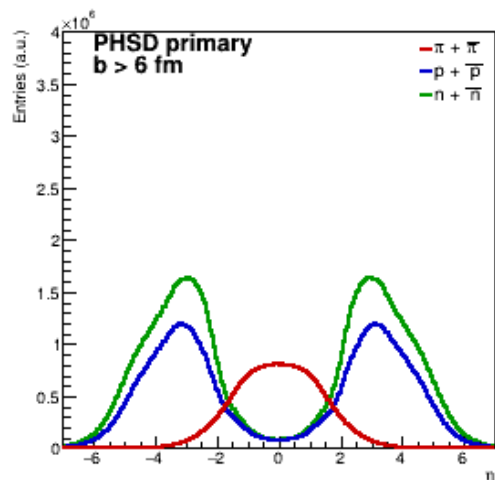
● PHSD vs UrQMD model

- MCTracks (full and primary)
- $2 < |\eta| < 5$ corresponds to FHCAL
- The peaks in spectator region disappear after simulation in PHSD model



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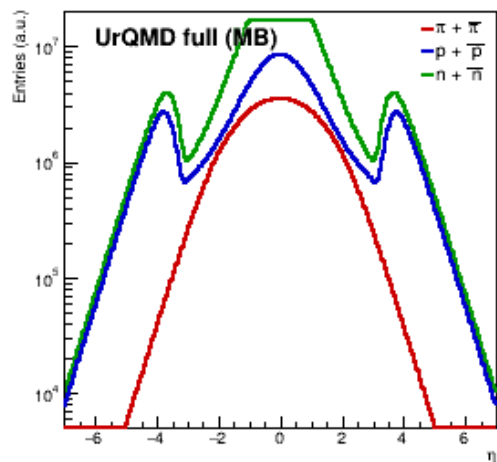
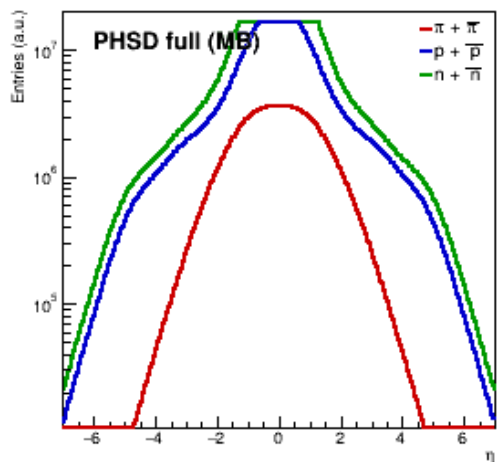
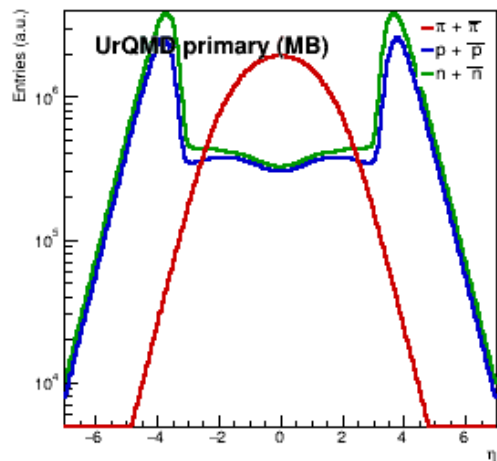
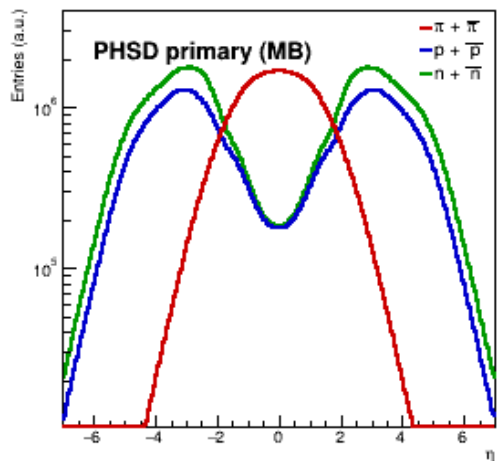
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- Updated PHSD dataset is available for analysis
 - Under investigation
- Event plane resolution comparison (PHSD vs UrQMD)
 - Differences in pseudorapidity distribution in the FHCAL region
- Outlook
 - Can this be fixed in PHSD?
 - Should we use another order of event plane resolution?
 - Compare with TPC?

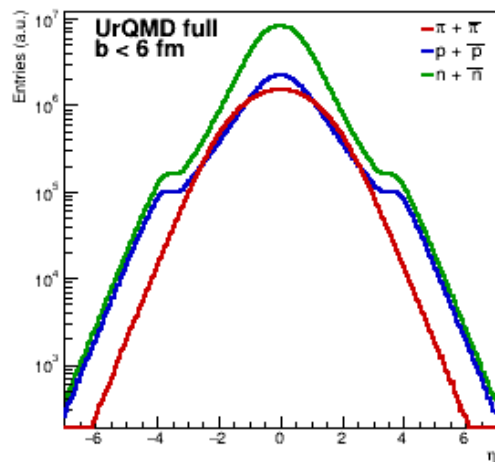
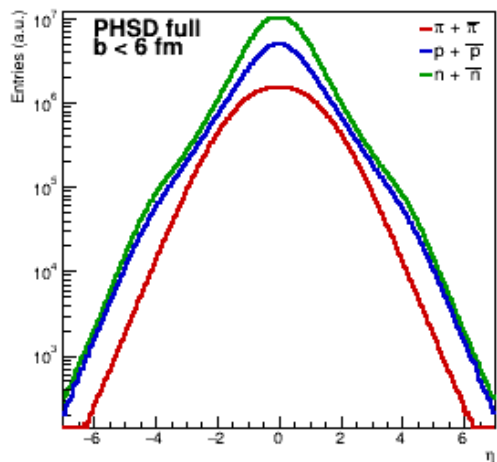
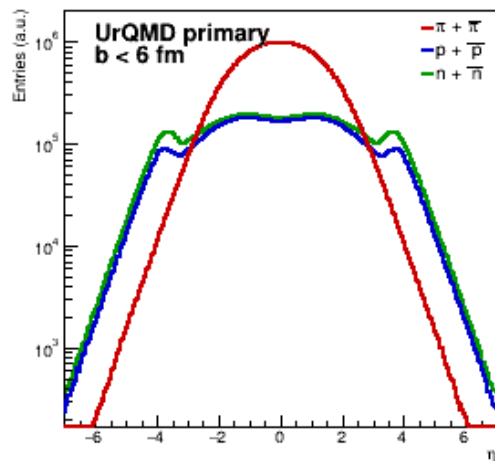
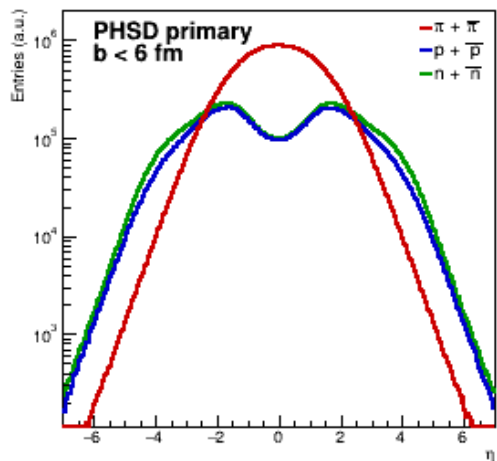


Thank you for your attention!



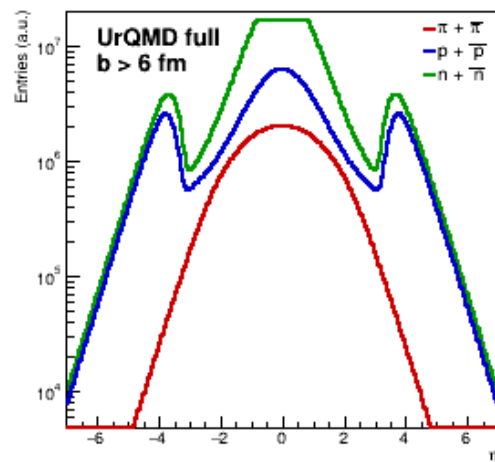
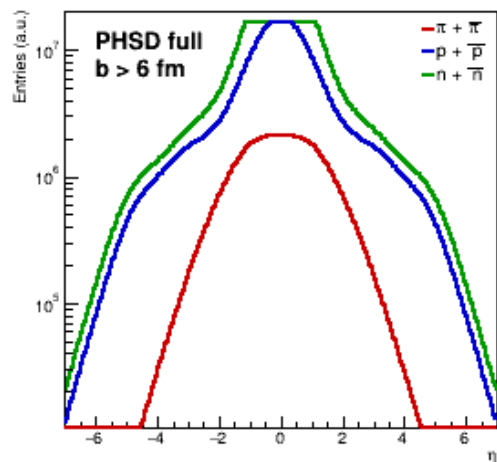
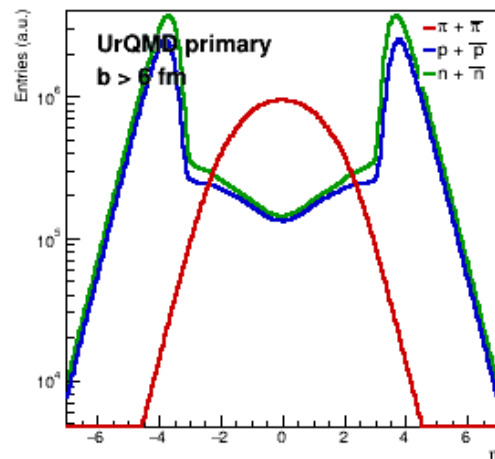
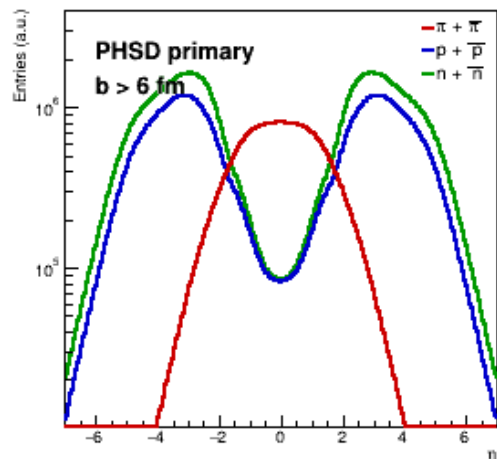
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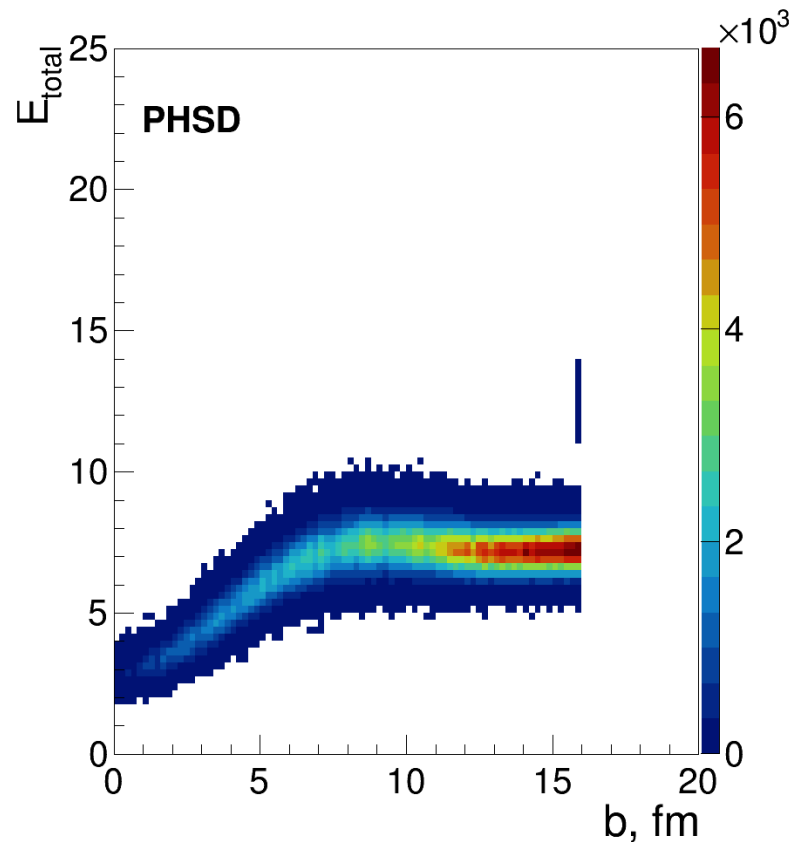
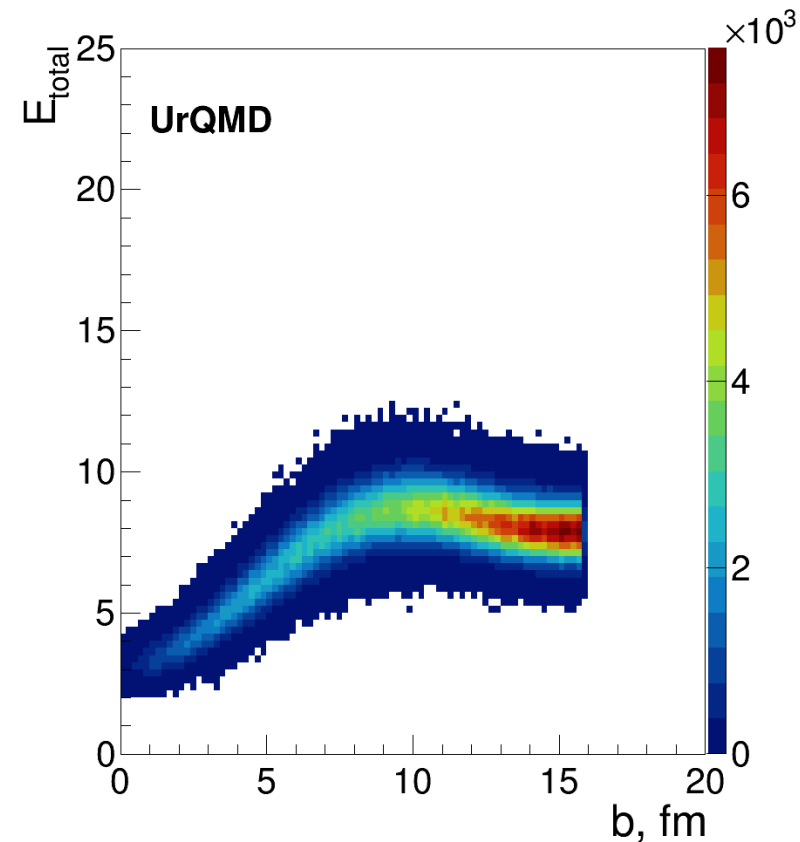
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- Comparison with UrQMD model
 - Total energy in FHCal