Secondary absorptive interactions in the Angantyr model

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Outline

Conflict

- Key observations from HI experiments : Collectivity, flow, strangeness enhancement , jet quenching
- Unexpected observations from pp collisions : Flow, and ridge like structures

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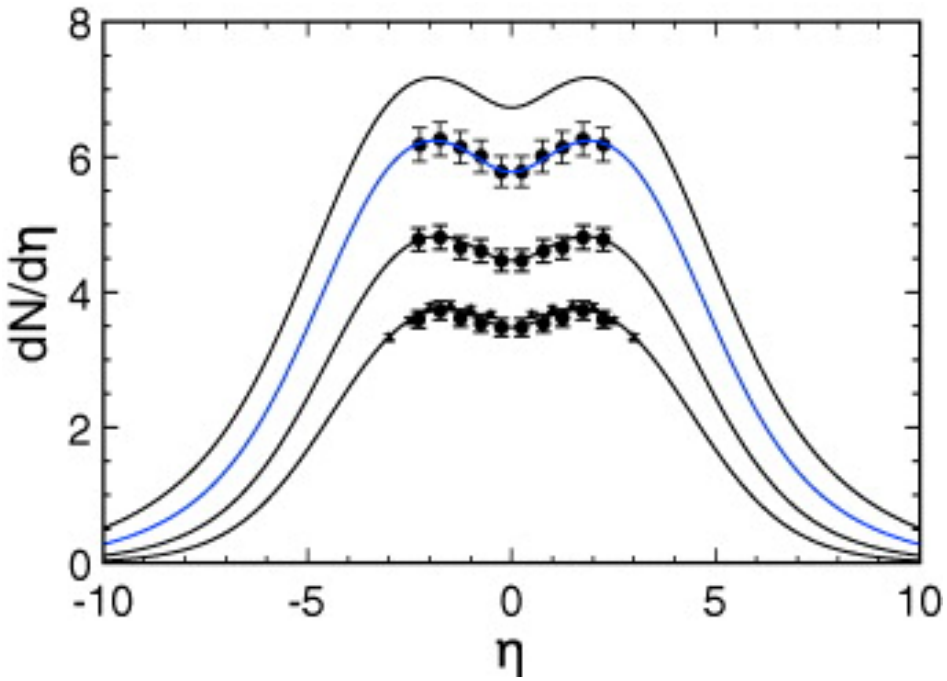
- Pythia8 MC: Doesn't use hydrodynamic models to simulate pp collisions & could not reproduce such observations
- Can we explain physics from pp to AA without assuming QGP production?

Multi-nucleon collision



(a) multiplicity distribution in pp collision at LHC energies 0.9, 2.36 and 7 TeV (bottom to top)(EPL 95 61001)

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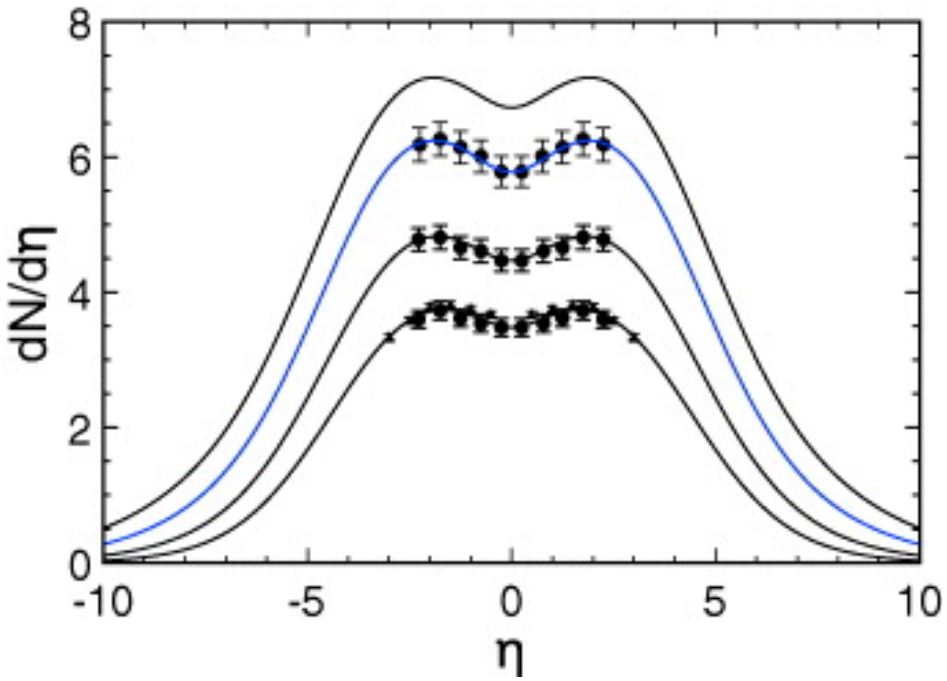

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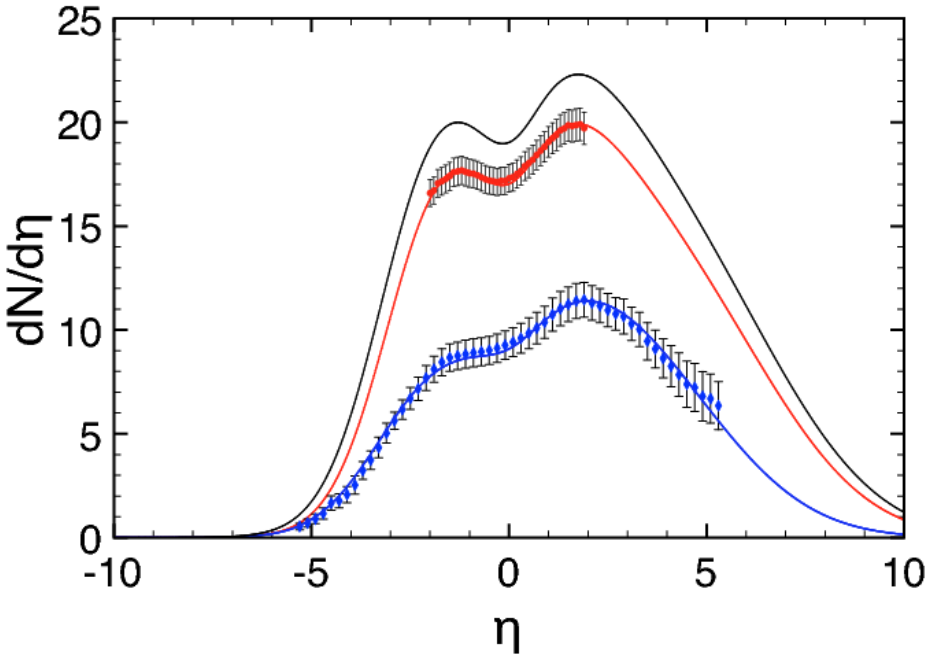
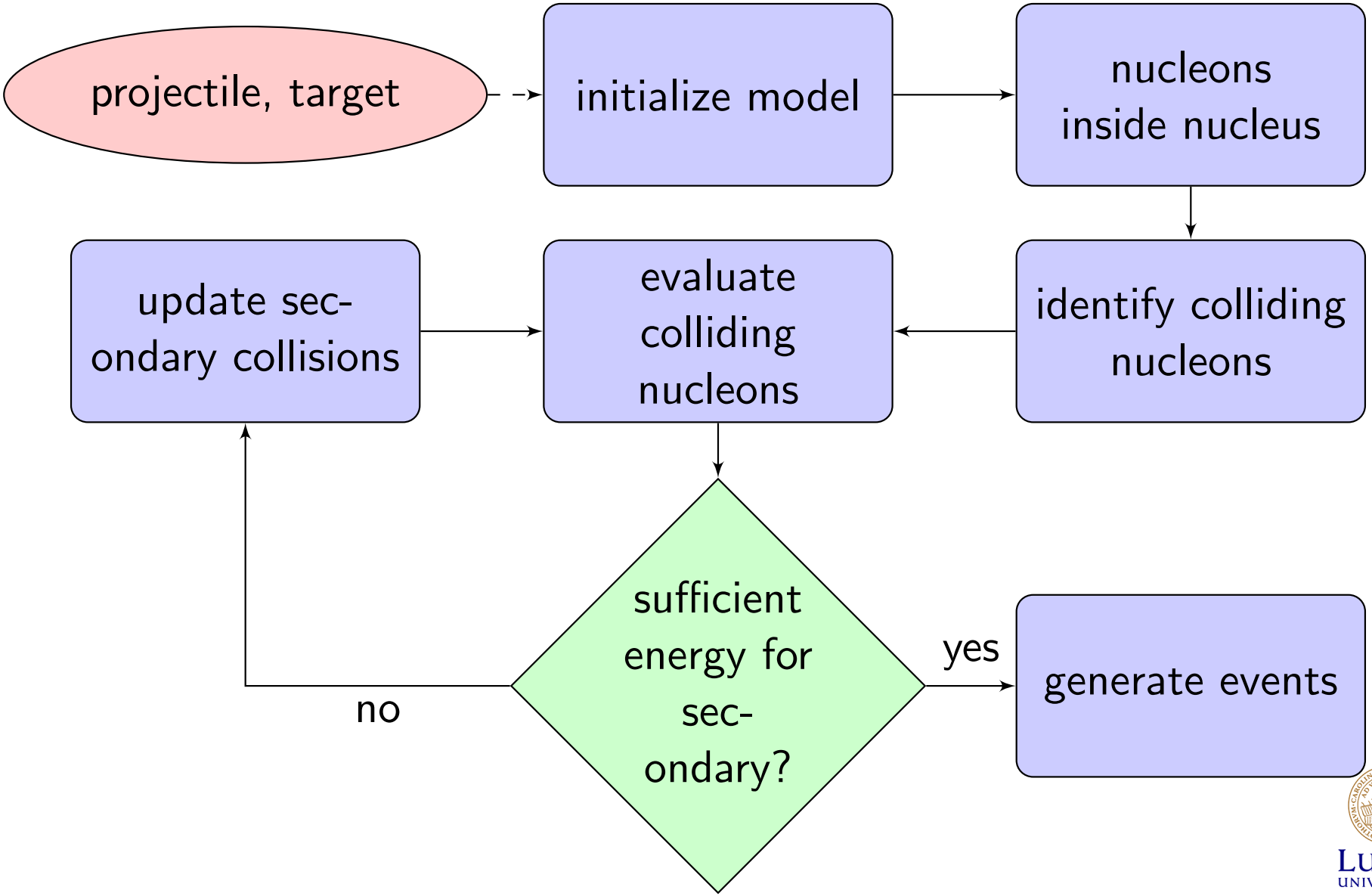


(b) multiplicity distribution in pPb ($\sqrt{S_{NN}}$ = 5.02 TeV)(red) and dAu ($\sqrt{S_{NN}}$ = 0.2 TeV) collision (blue)(arXiv:1502.01056 [hep-ph])

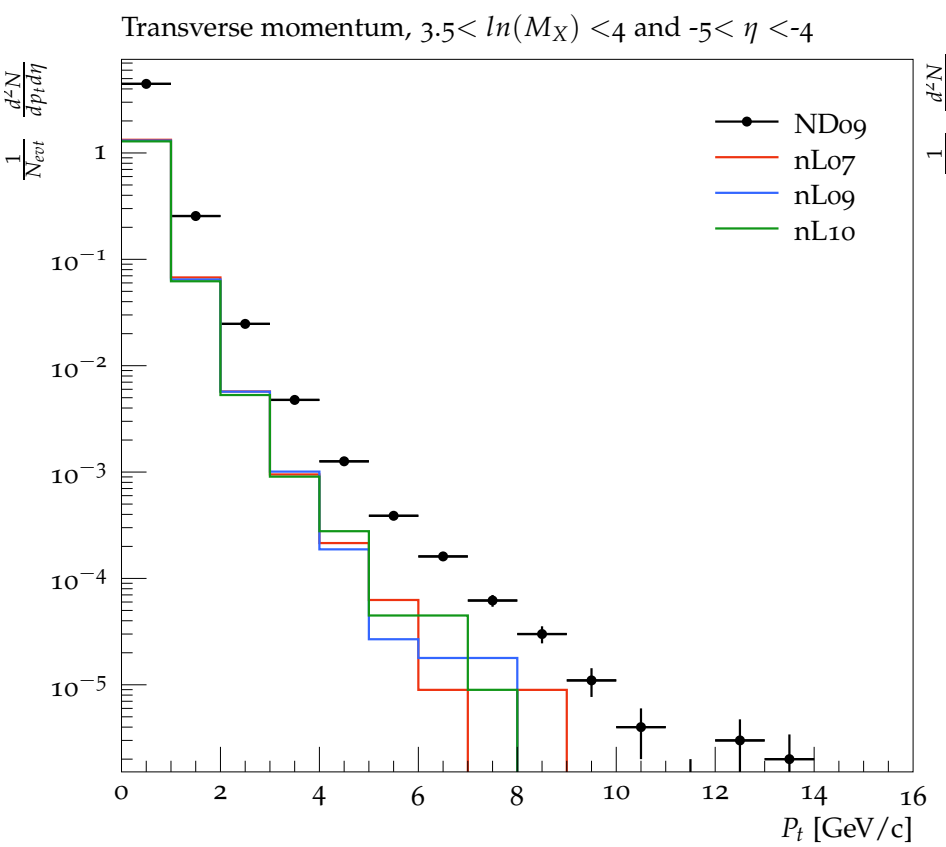
Collisions in Angantyr



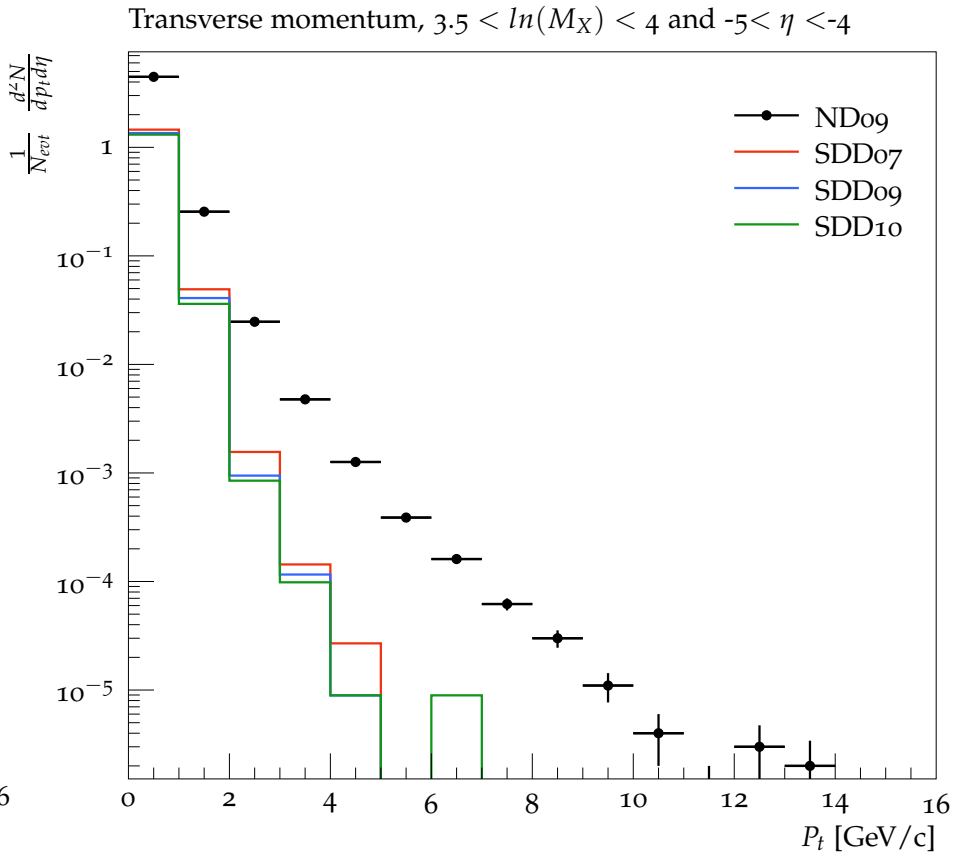
Secondary absorptive collisions

- Wounded nucleons: Nucleons participating into interactions
- Diffractive excitations in projectile and target can also interact with nucleons in target and projectile respectively
- One of the participating nucleon : marked as absorptive wounded nucleon
- Interactions with diffractive excitation of such nucleons : considered as secondary absorptive collisions
- We modified SD events such a way that for range of η bins and at given impact parameter such events look alike secondary absorptive events

Results



(a) Pt distribution of modified SD at different impact parameters compared to ND Pt distribution (b = 0.9)



(b) Pt distribution of Pythia8 default SD at different impact parameters compared to ND Pt distribution (b = 0.9)

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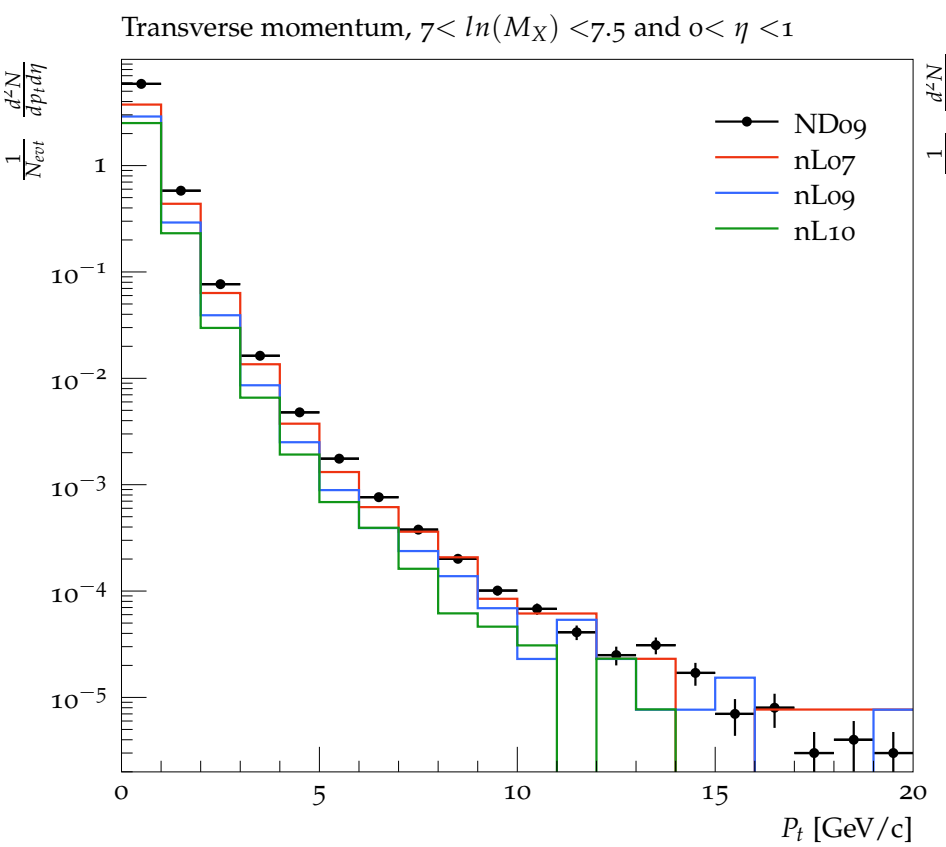

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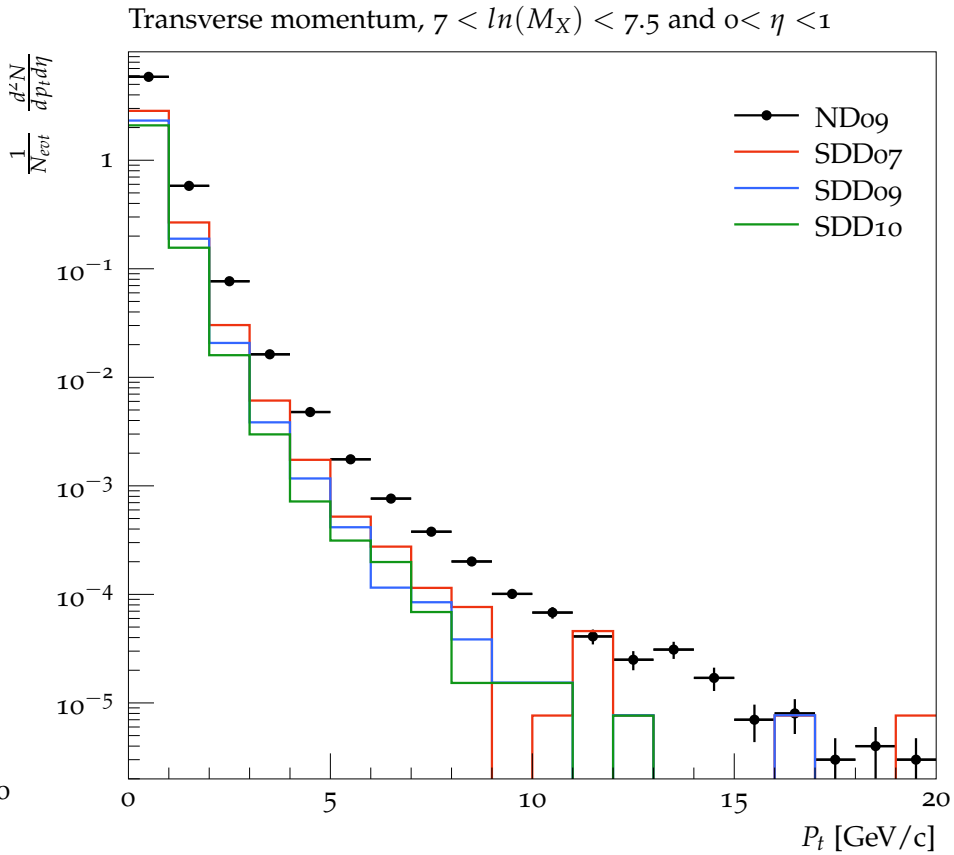

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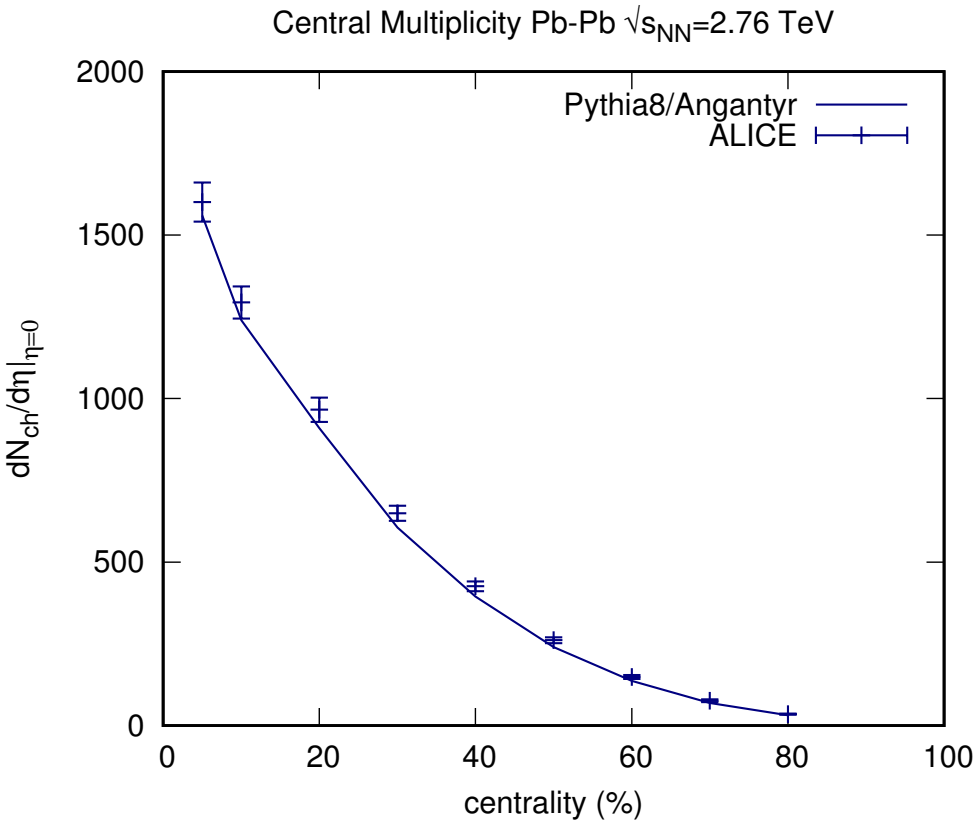

(a) Angantyr generated Multiplicity compared with ALICE experiment (preliminary)

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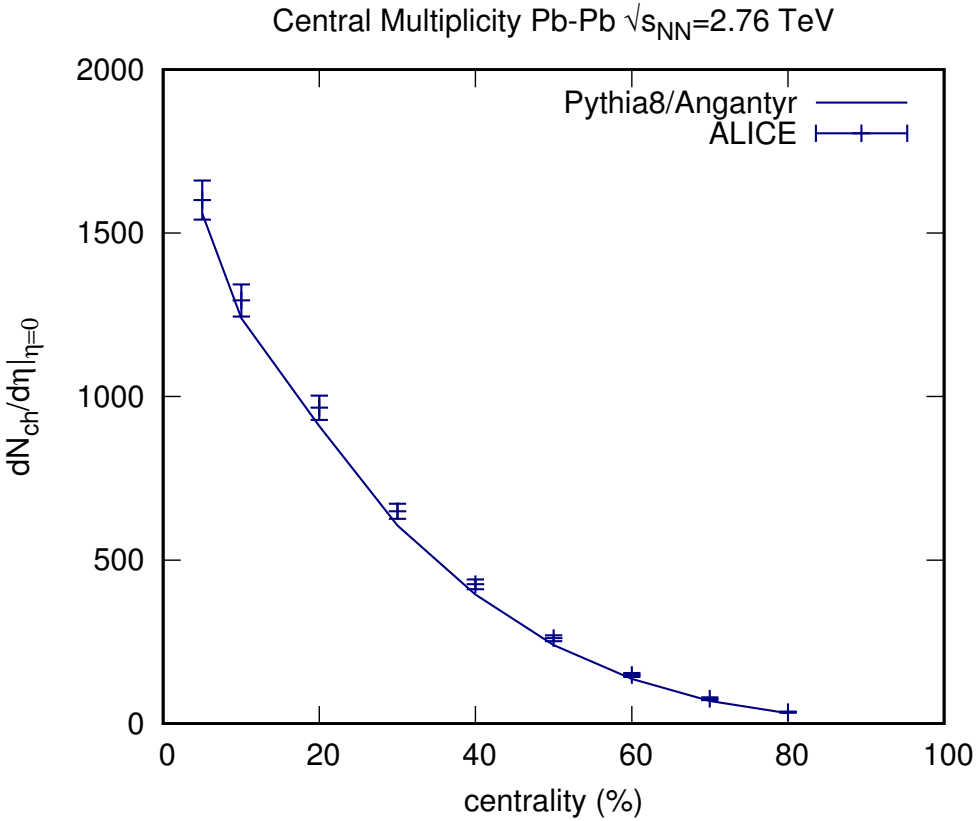

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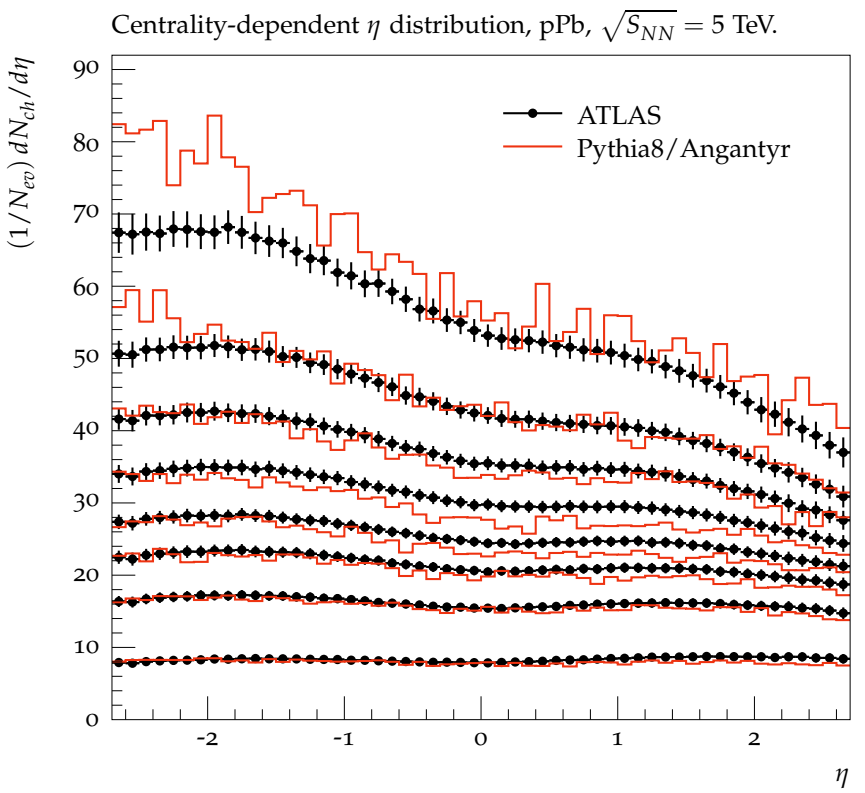

(b) Multiplicity distribution in pPb compared with ATLAS experiment (preliminary)

summary

- The Angantyr model for heavy-ion physics, is implemented in Pythia8
- In the model, secondary collisions are generated via modified single diffractive collisions
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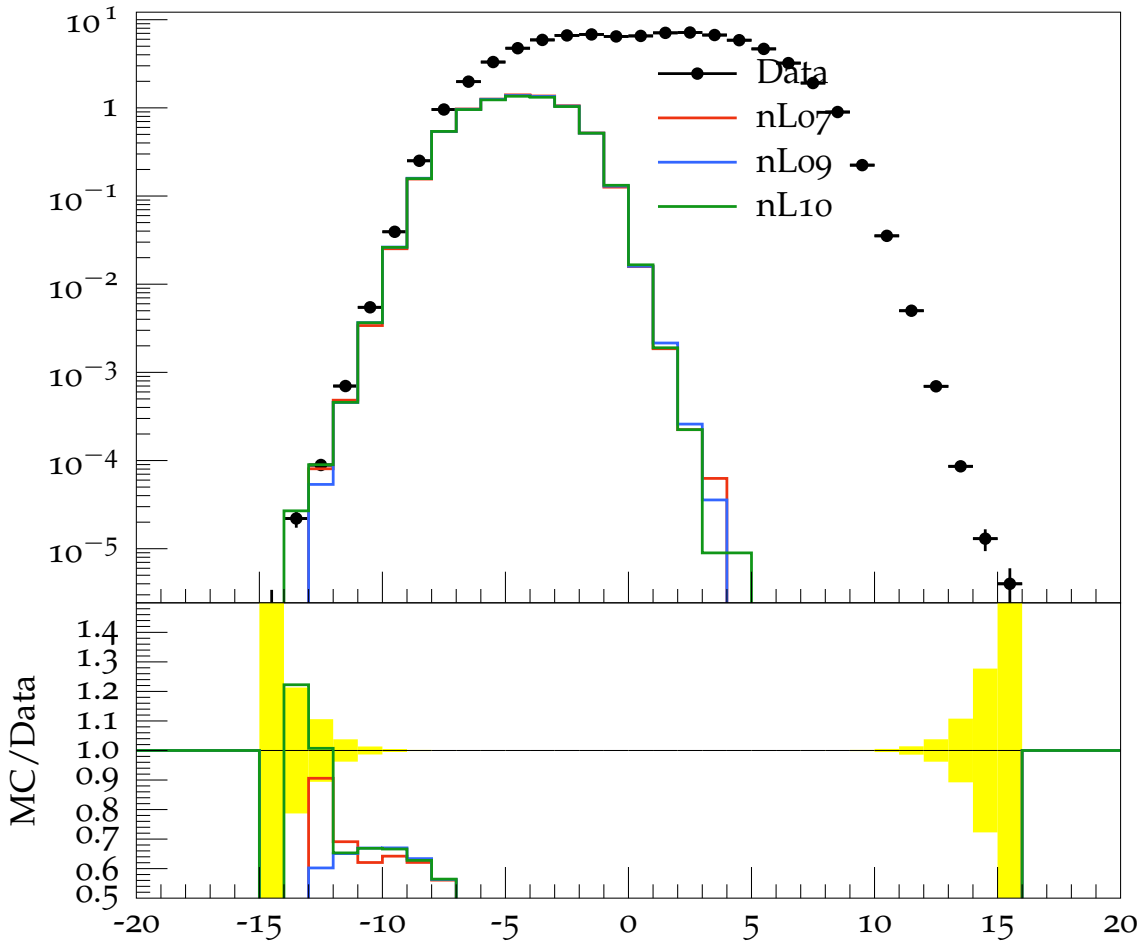
THANK YOU

Back up



(a) multiplicity distribution of modified SD at different impact parameters compared to ND multiplicity distribution (b = 0.9) for diffractive mass range $3.5 < ln(M_X) < 4$