Jet substructure in eA collisions

Motivation

- Understanding the effect of the nuclear medium on jet (event) structure

- Studying the emergence of jets as a function of CM energy

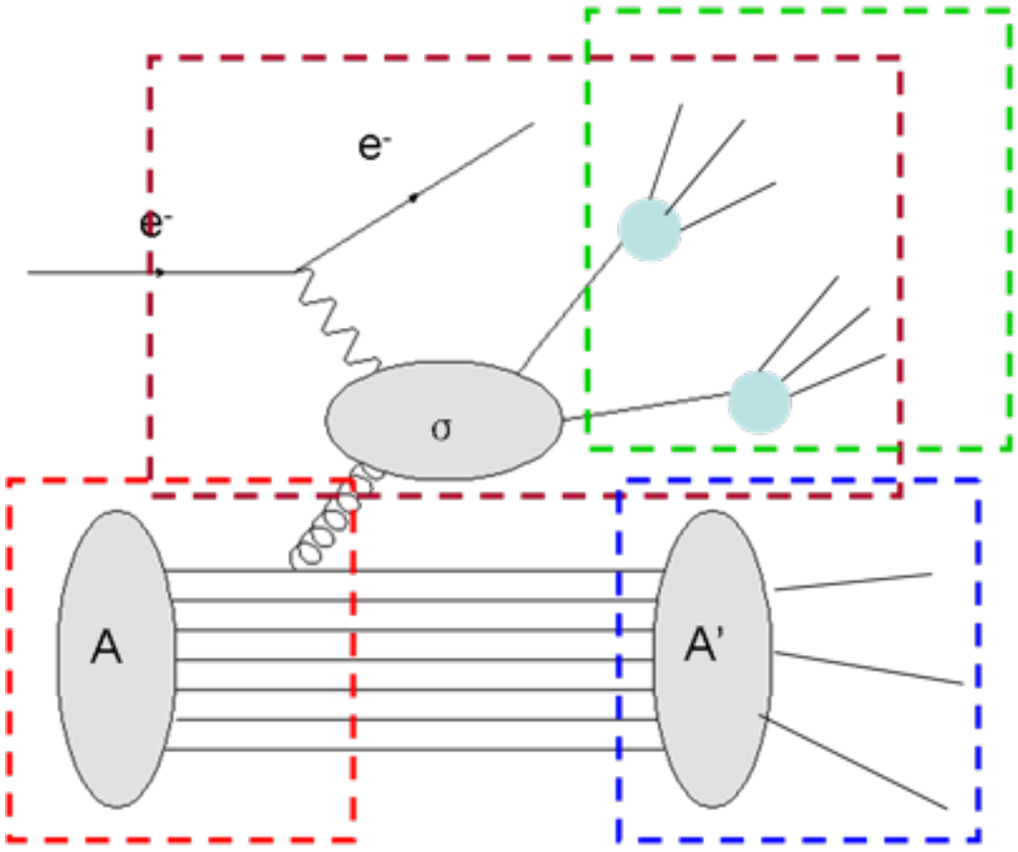
Tools :

- Using BeAGLE event generator, compare observables across different systems and energies :

  e (18) + Au (110) e (18) + C (110) e (18) + p (110)

- FASTJET 3.3

BeAGLE



A hybrid model consisting of DPMJet and PYTHIA with nPDF EPS09.

Nuclear geometry by DPMJet and nPDF provided by EPS09.

Parton level interaction and jet fragmentation completed in PYTHIA.

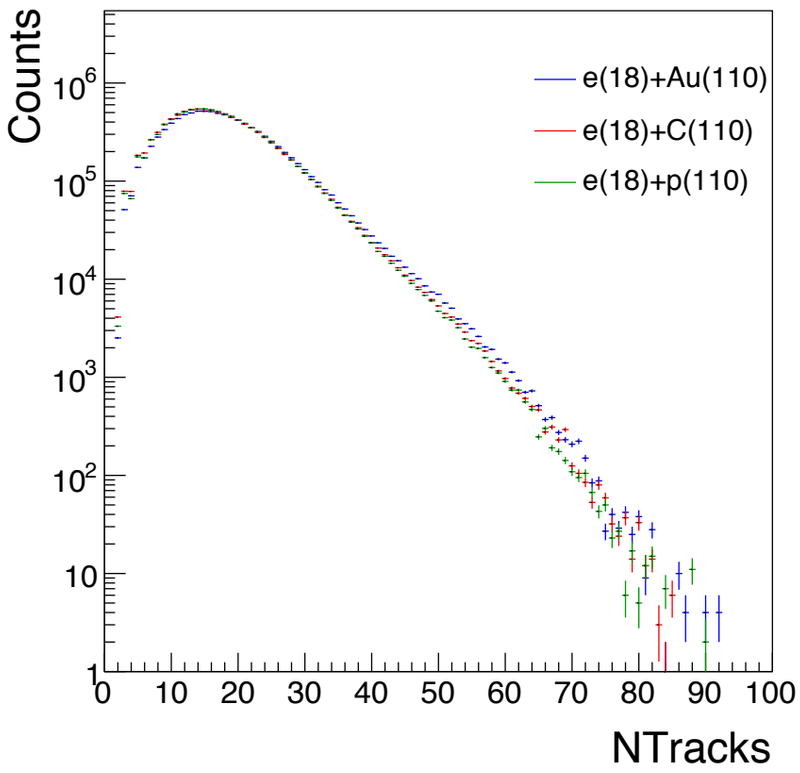
Nuclear evaporation (gamma dexcitation/nuclear fission/fermi break up) treated by DPMJet

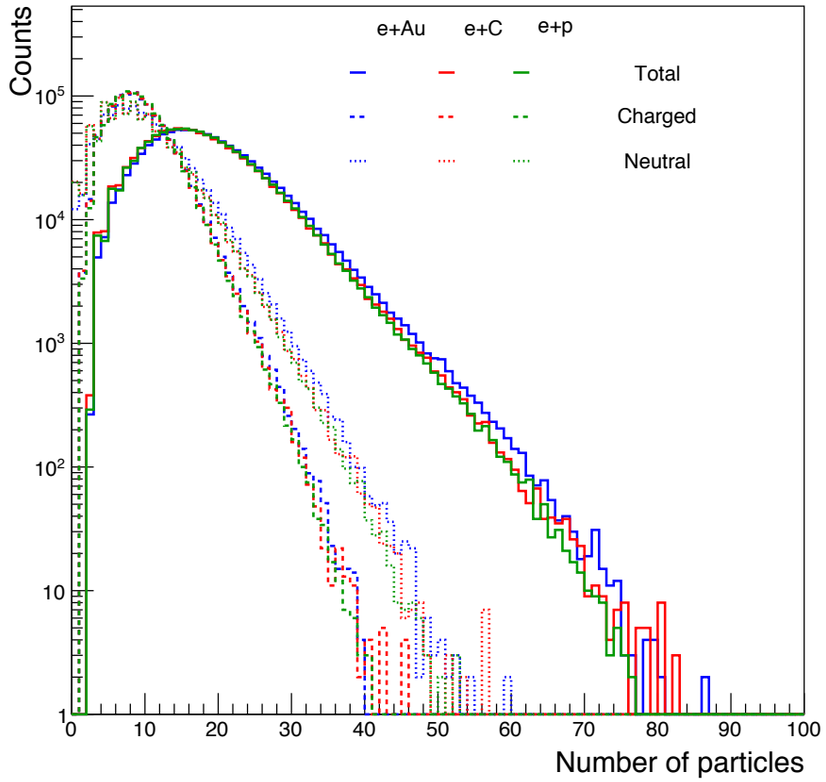
Energy loss effect from routine by Salgado&Wiedemann to simulate the nuclear fragmentation effect in cold nuclear matter

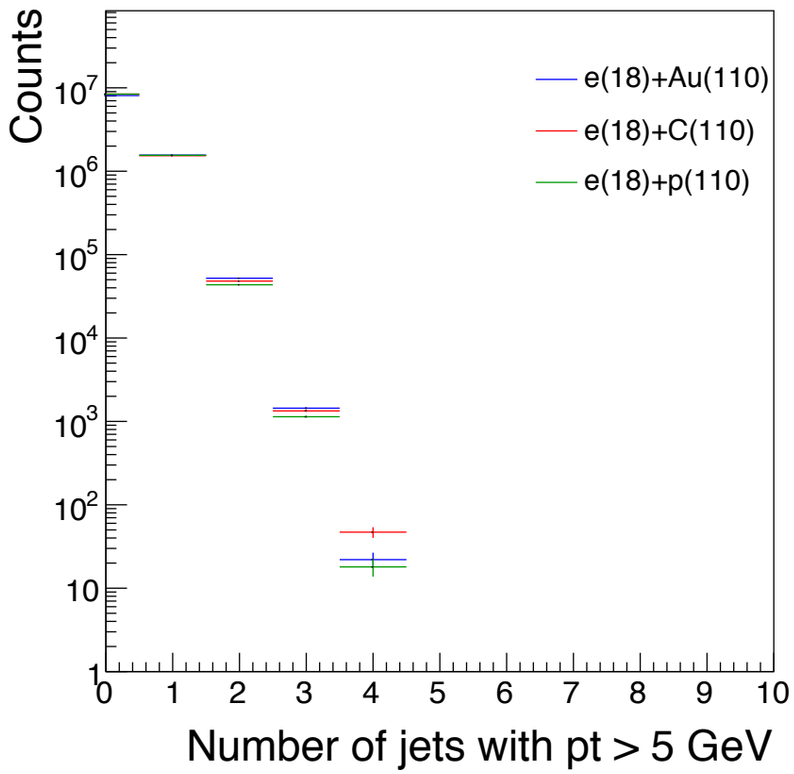
- Monte-Carlo generator — Benchmark eA Generator for LEptoproduction
- Developed by the BNL group

- Includes nuclear PDFs by linking PYTHIA PDF library to LHAPDF
- Allows hard collisions to occur on neutrons as well as protons, thereby, conserving charge
- Allows for multiple nucleons to participate in the collision in the kinematic region where nuclear shadowing occurs

Event variables

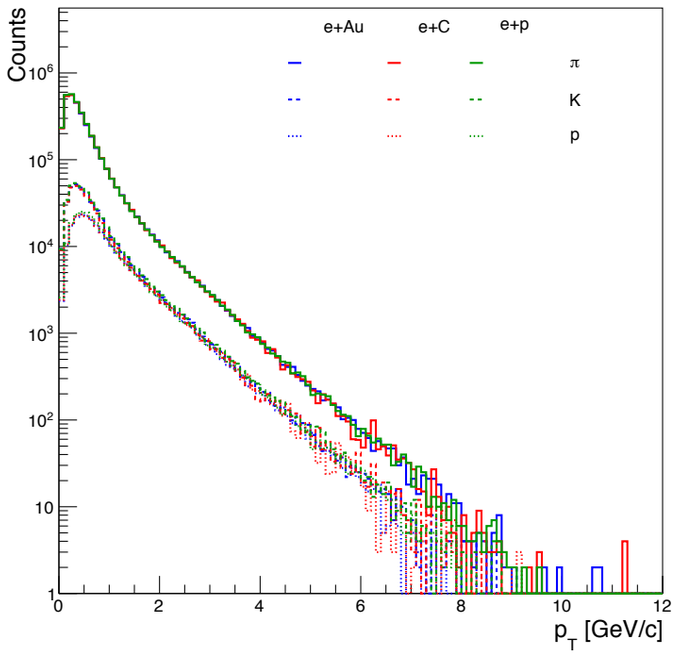


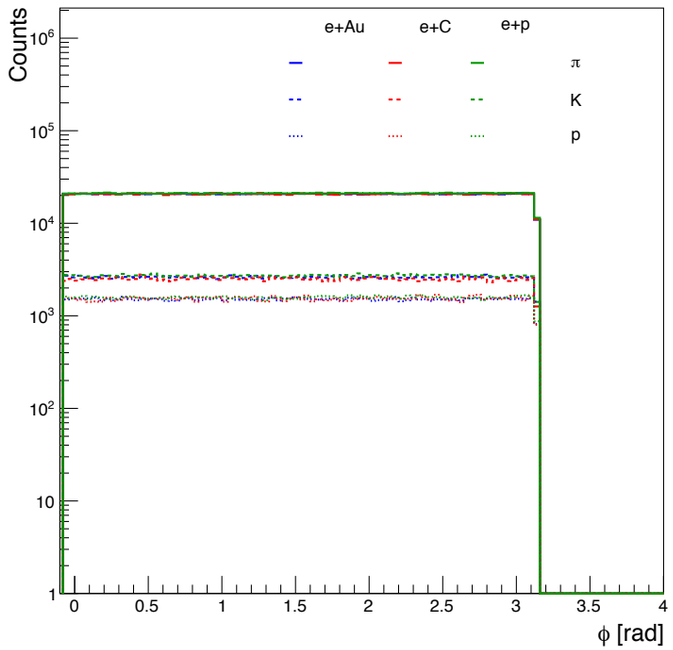


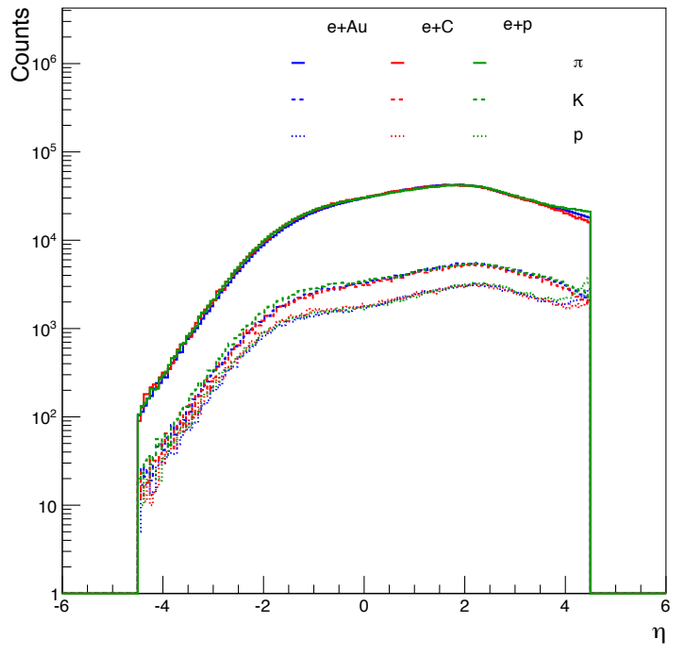


Particle distributions

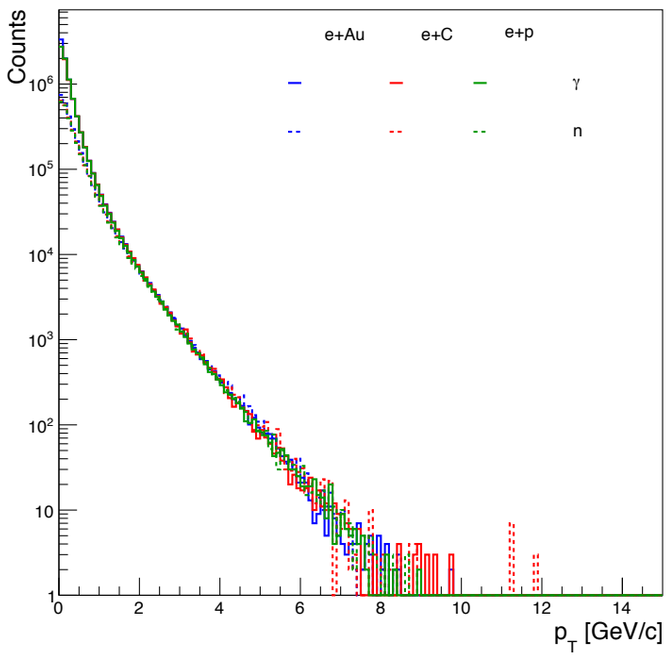
Charged particles

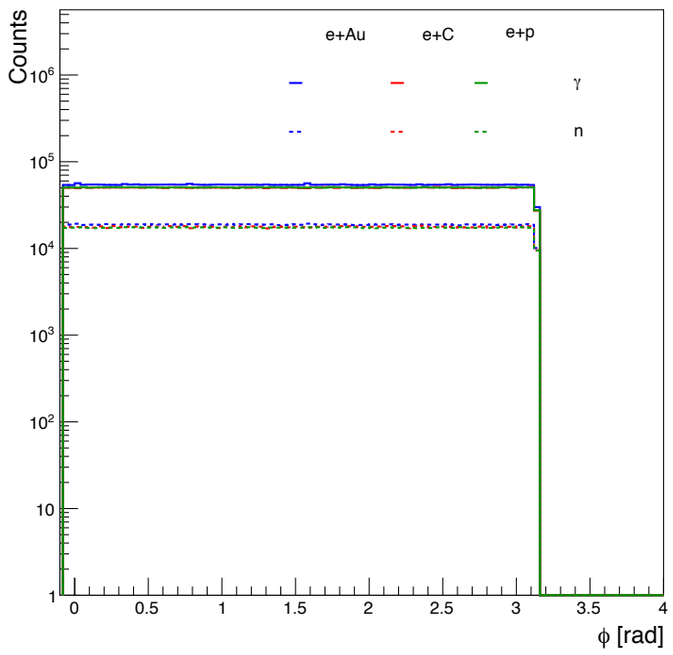


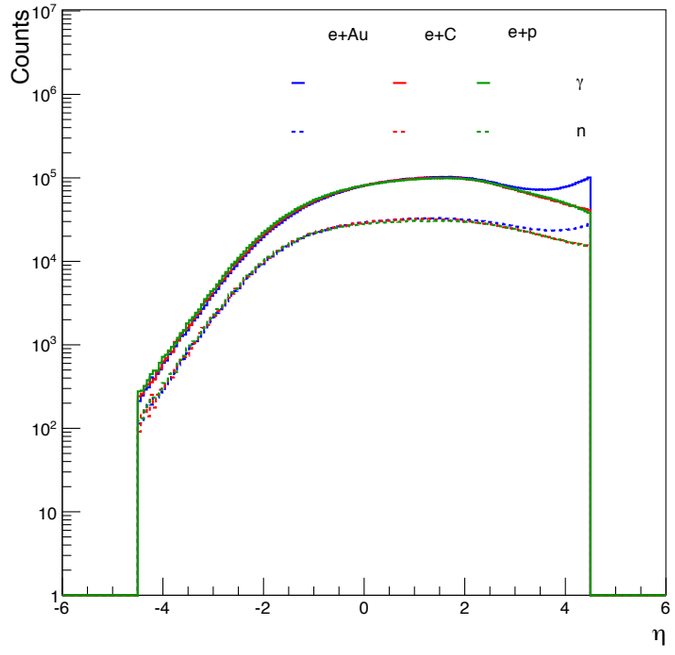




Neutral particles

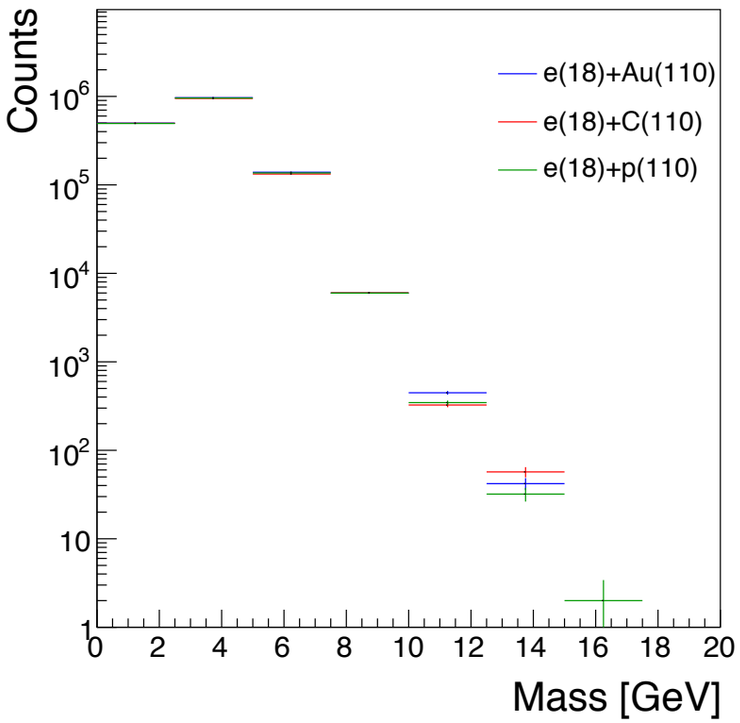


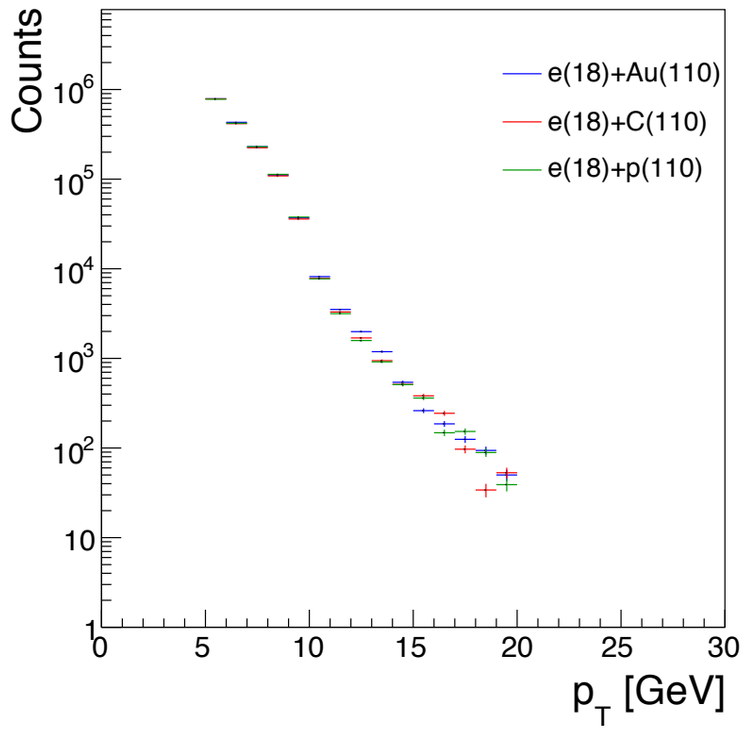


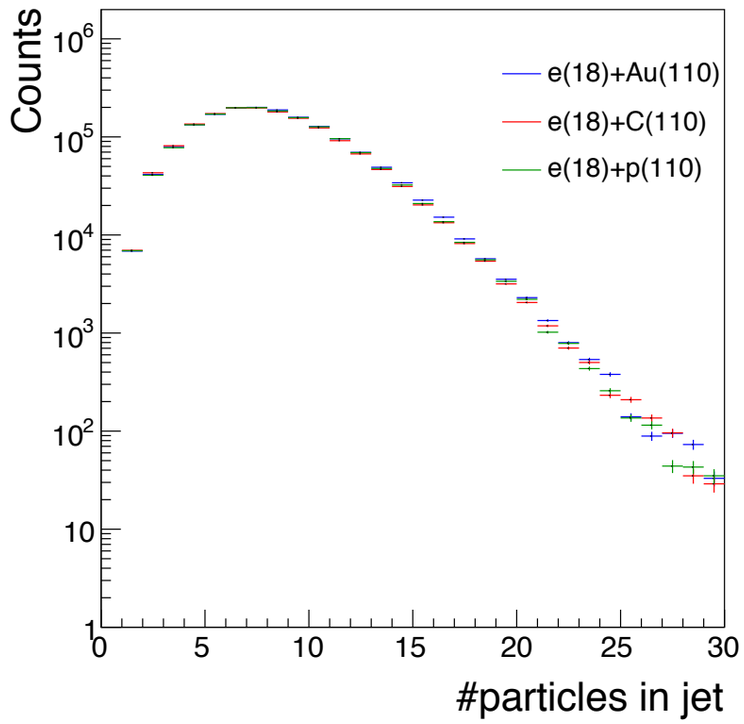


Q^2 >10; kT-algorithm; R = 1.0; min. p_T = 5.0 GeV/c; $|\eta|$ < 4.0

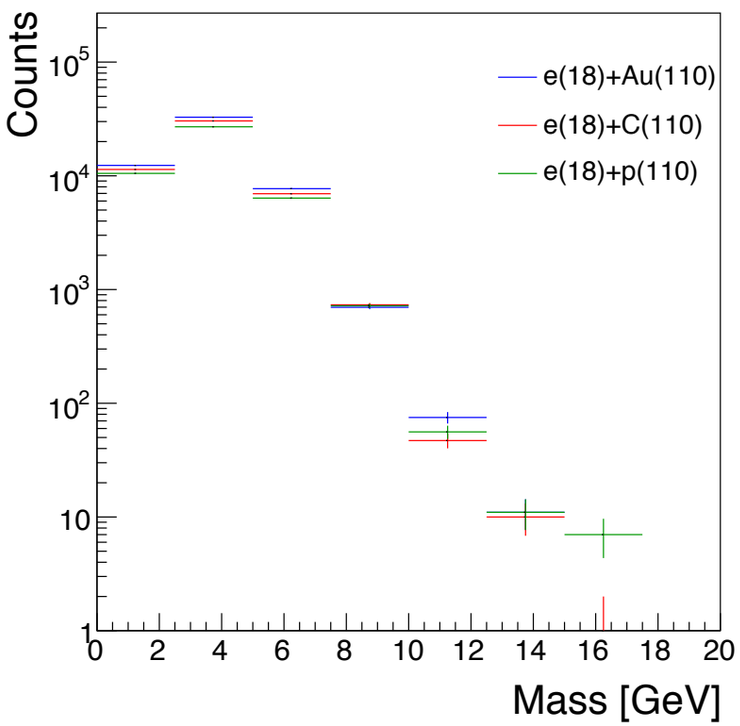
Leading jet

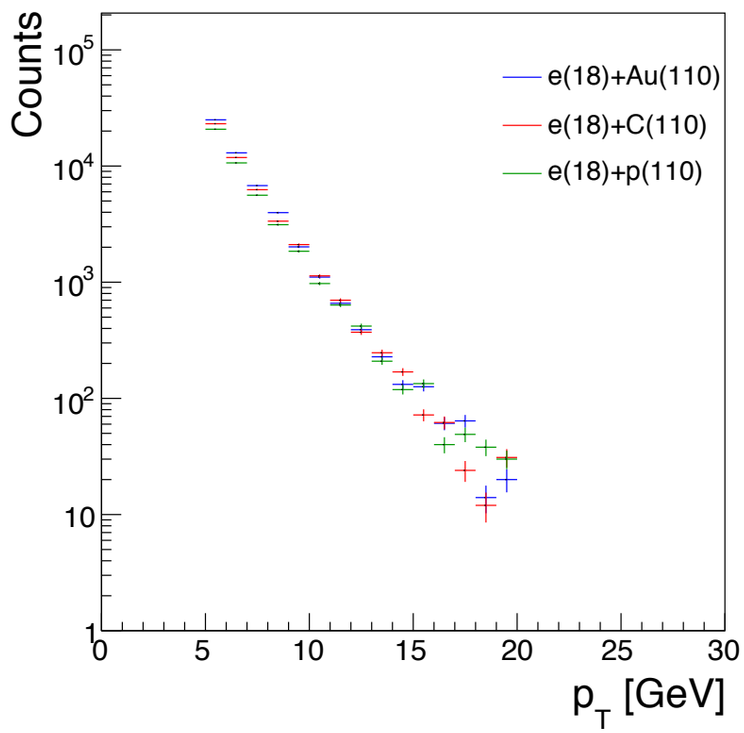


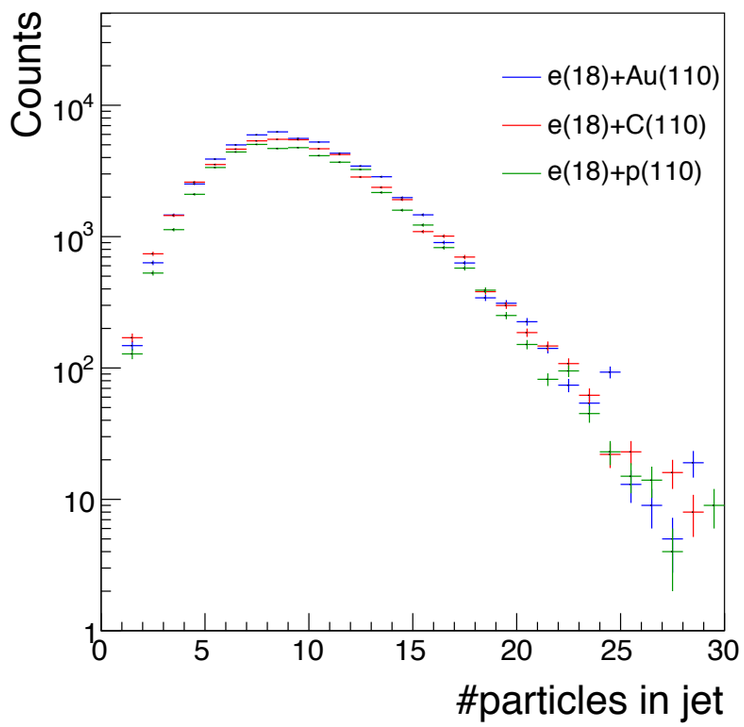




Sub-leading jet







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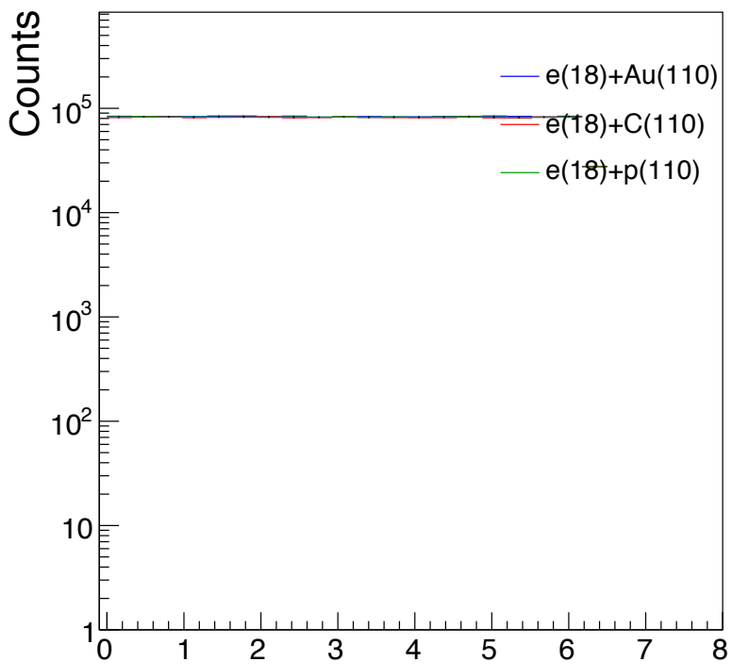

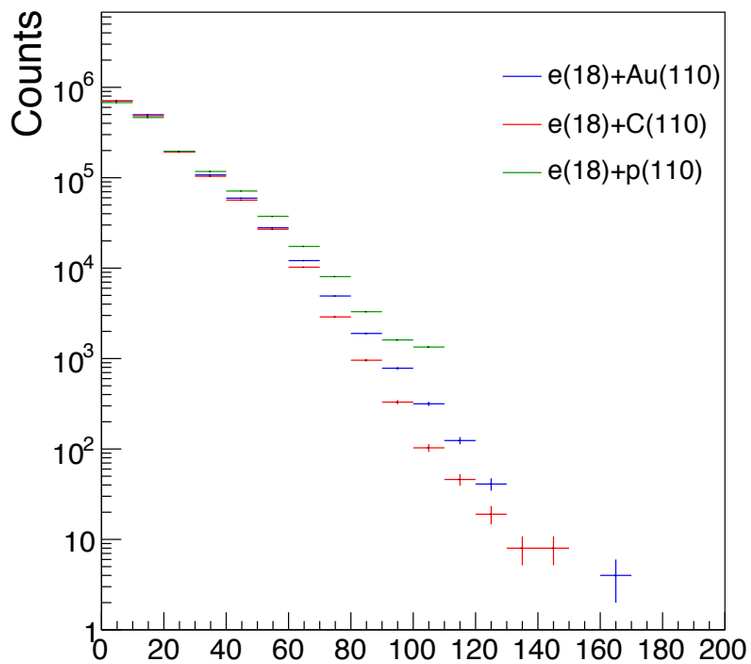

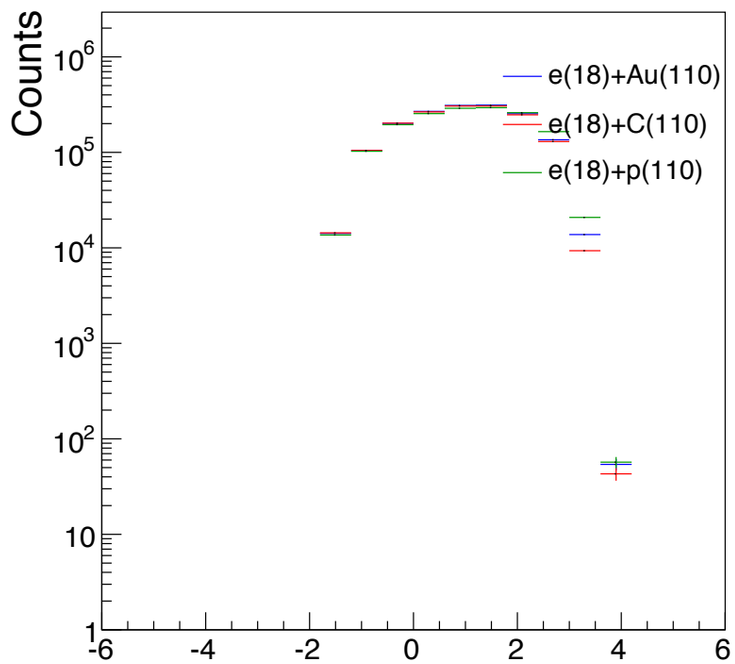

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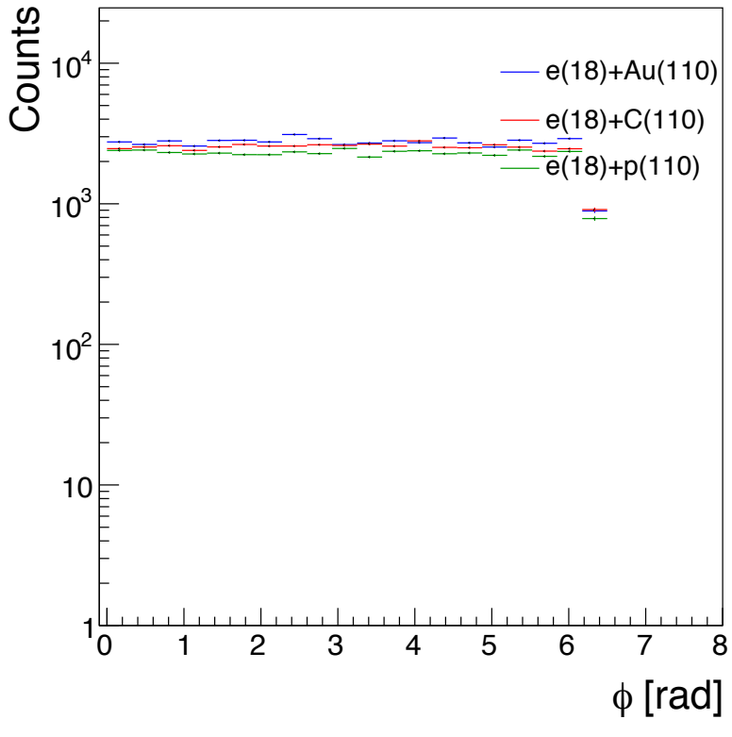

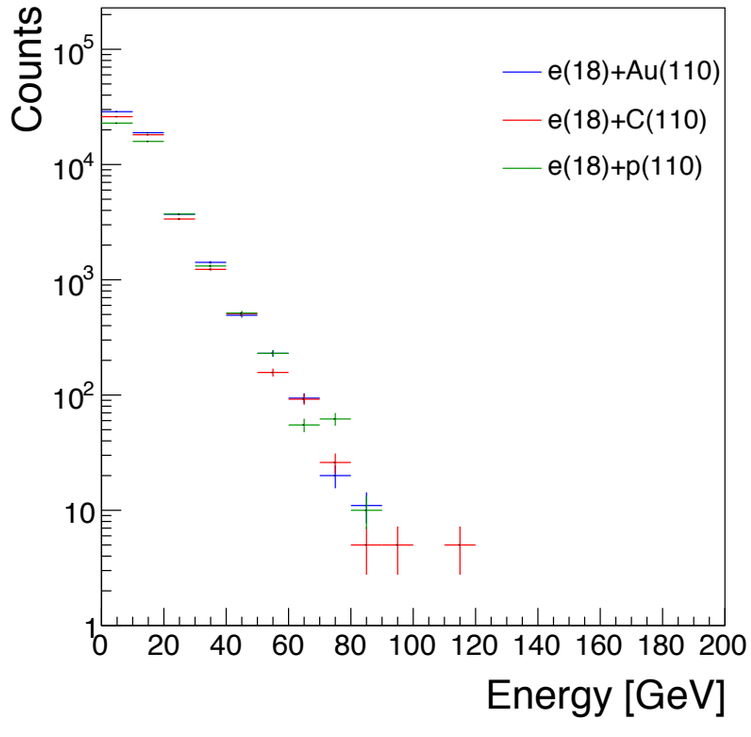

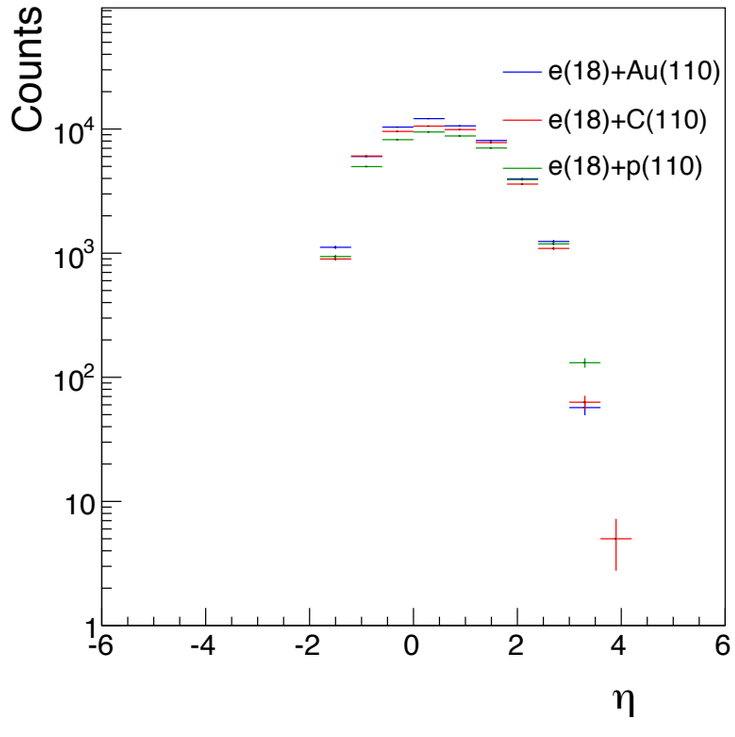

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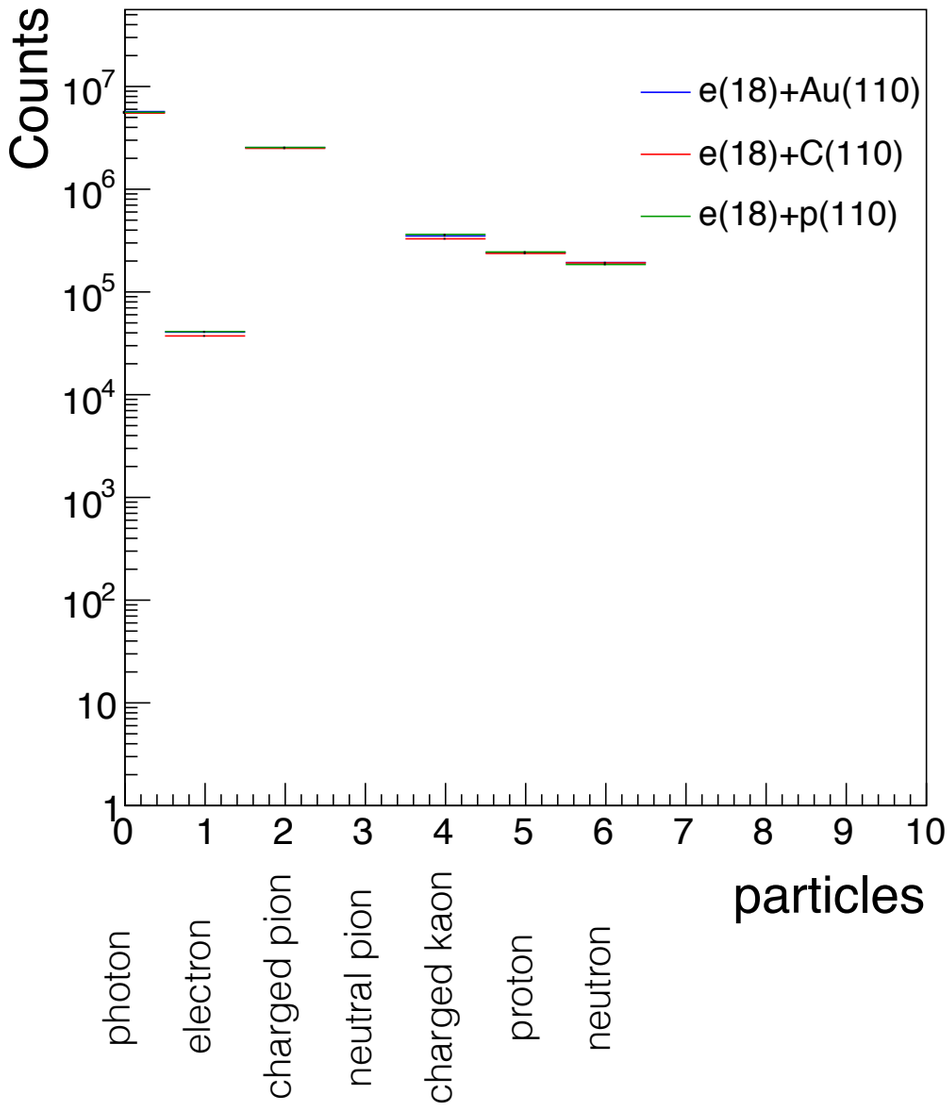

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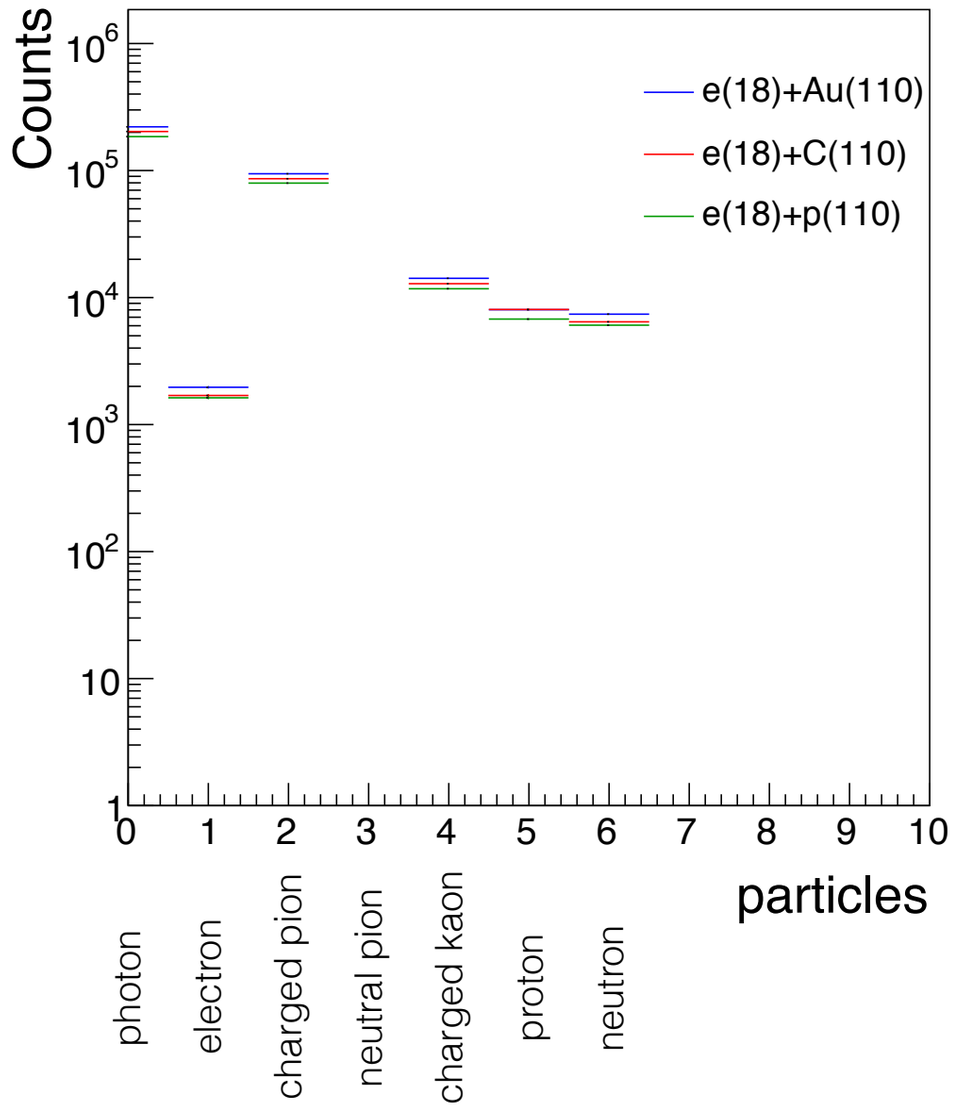

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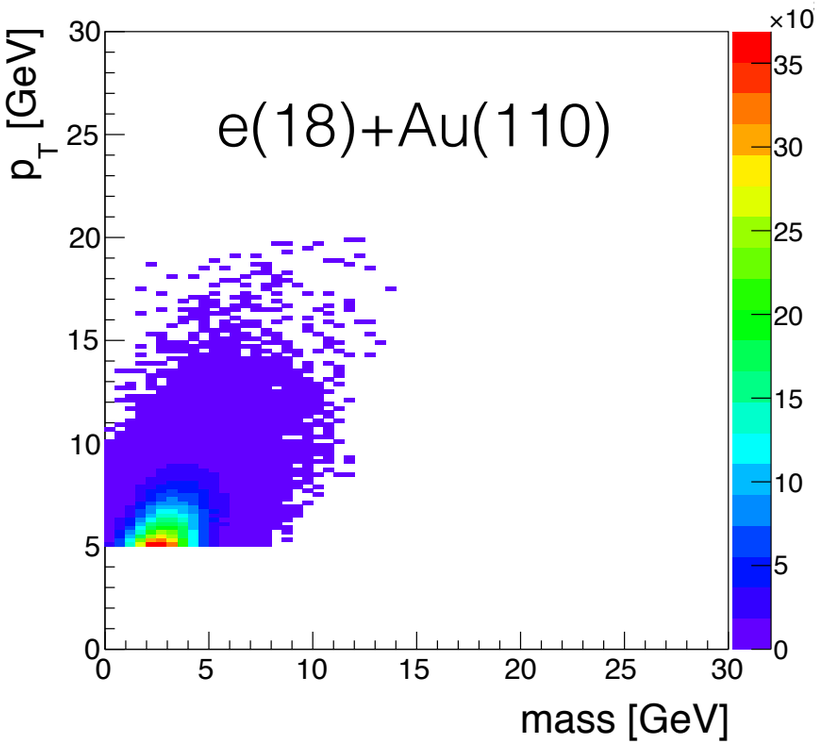

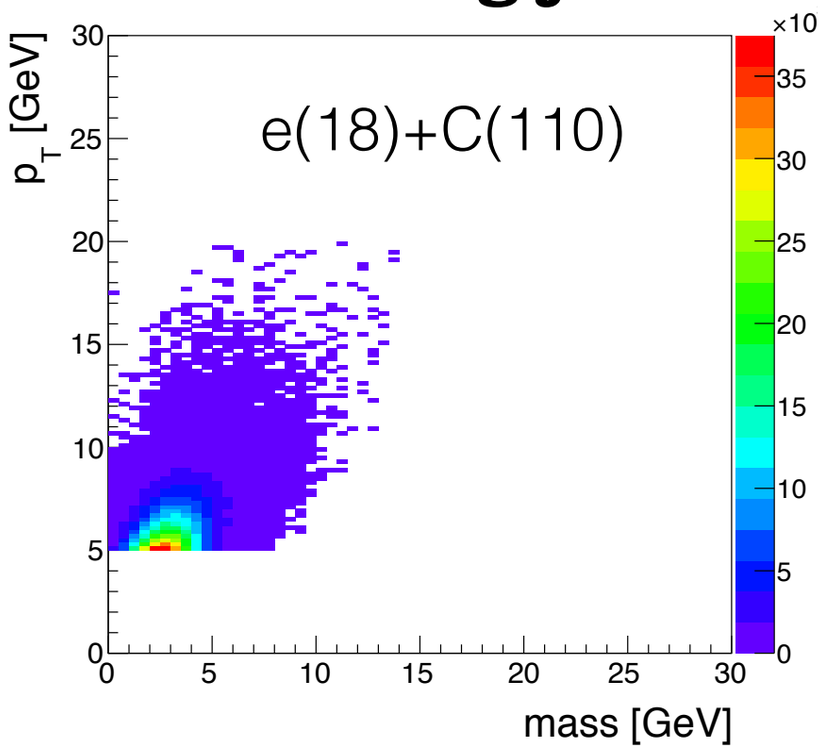

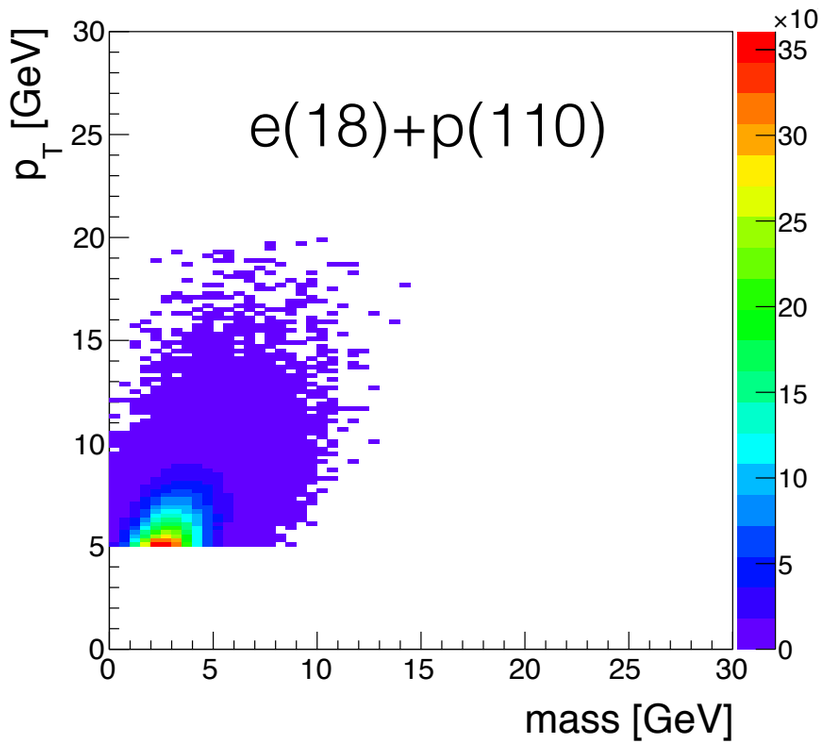

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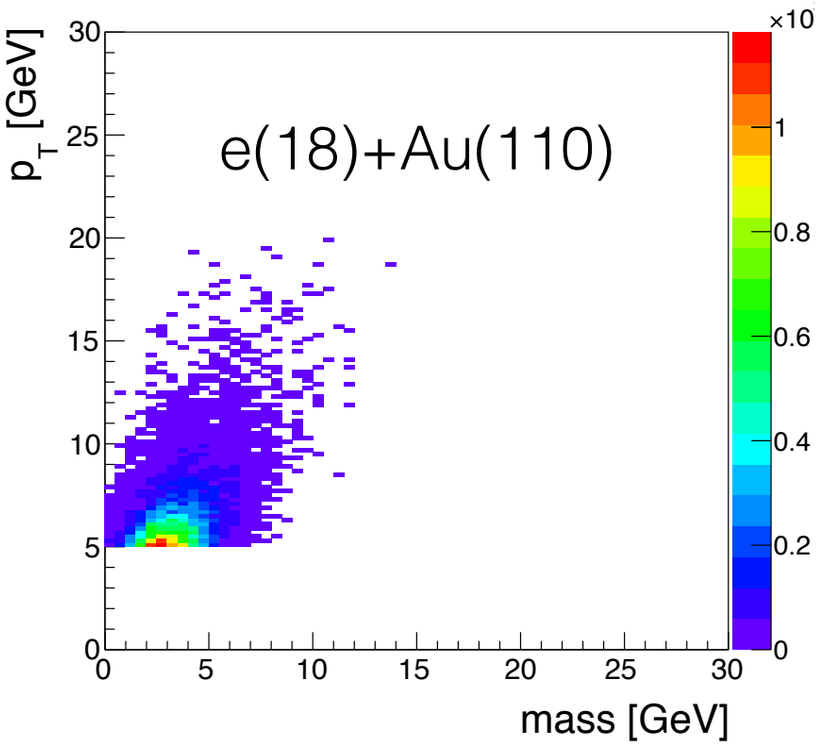

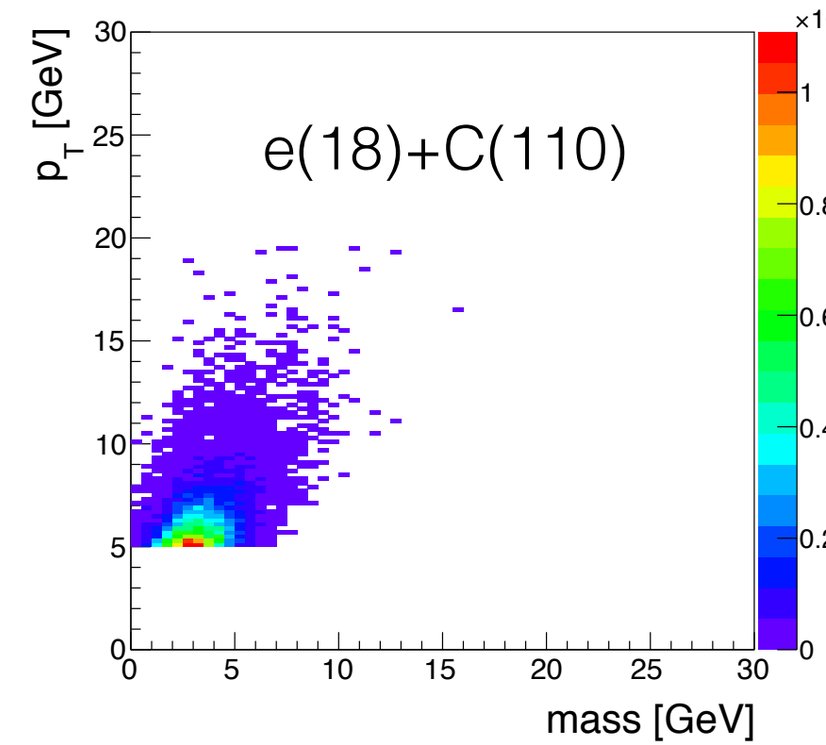

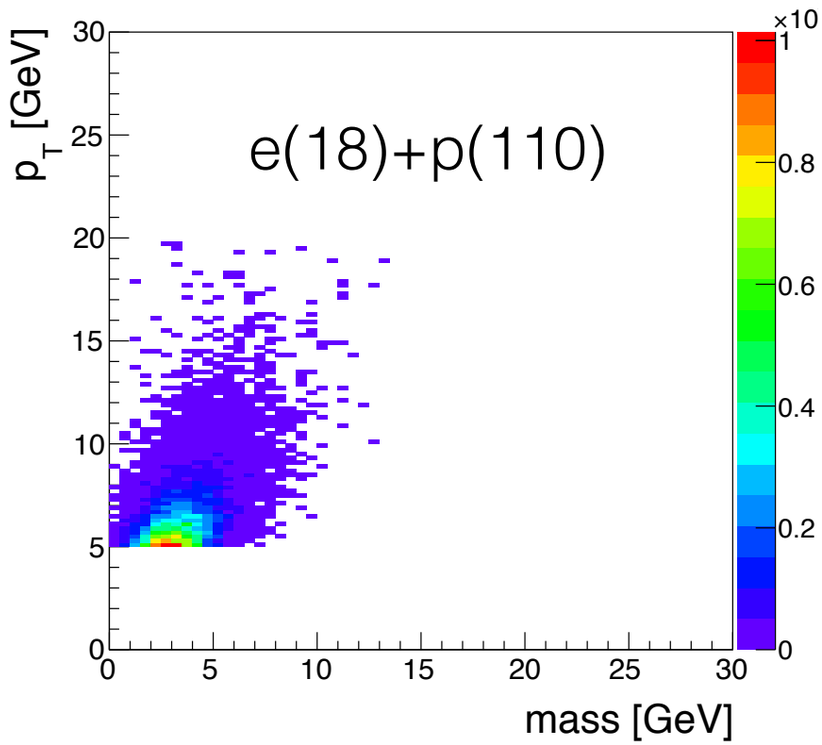

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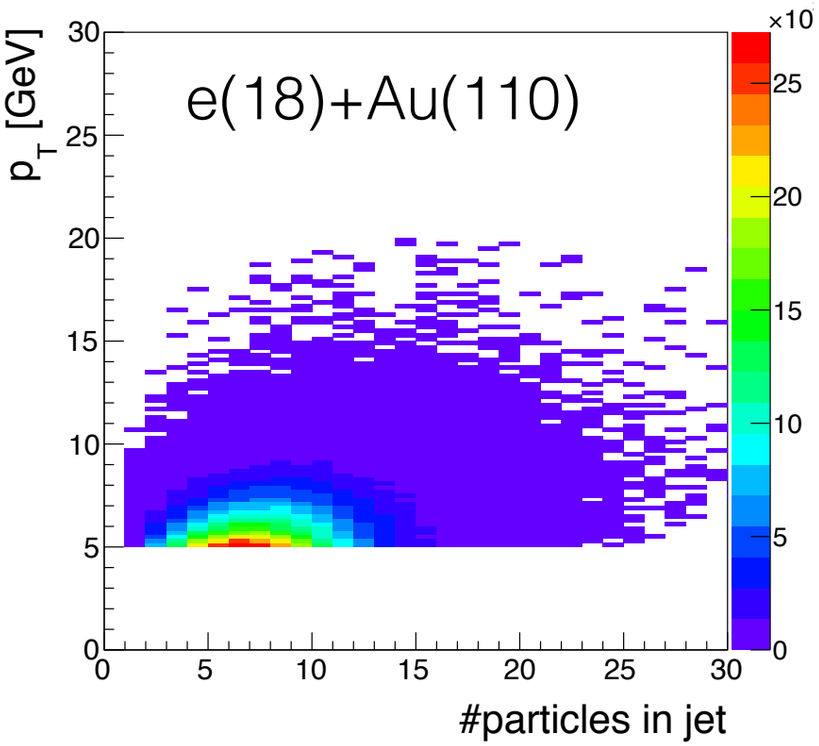

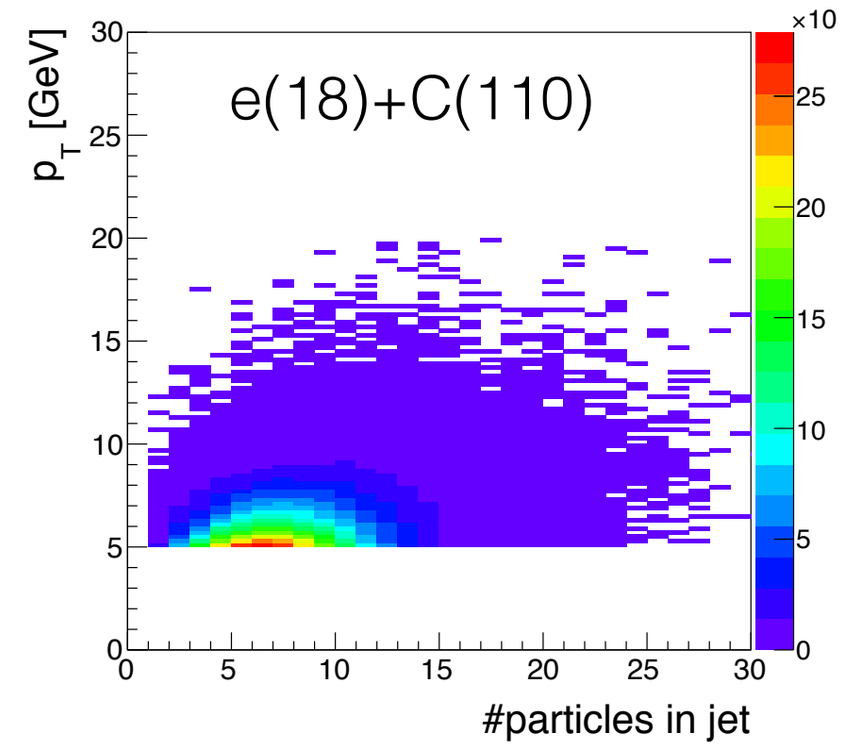

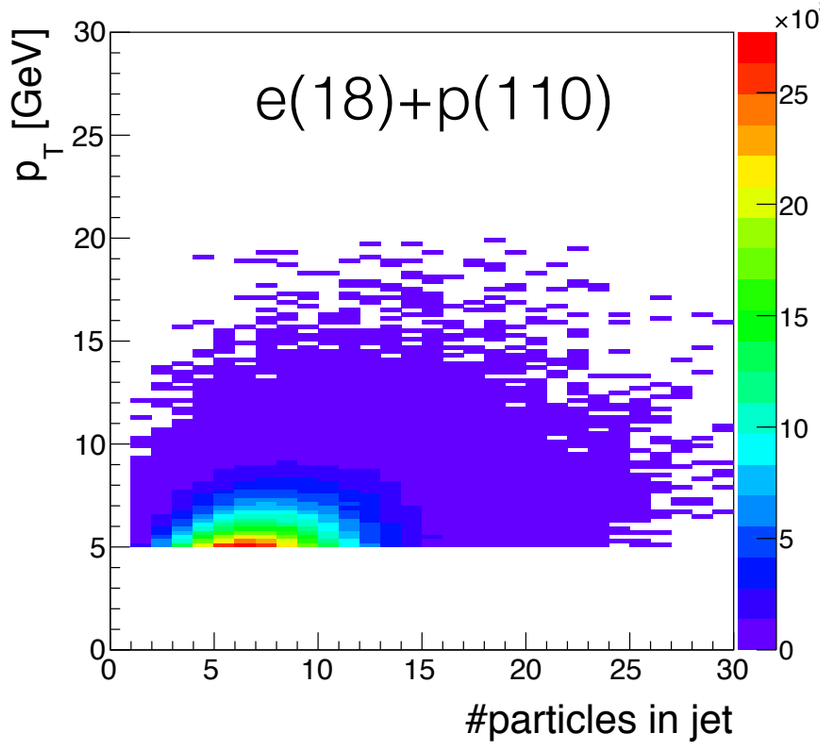

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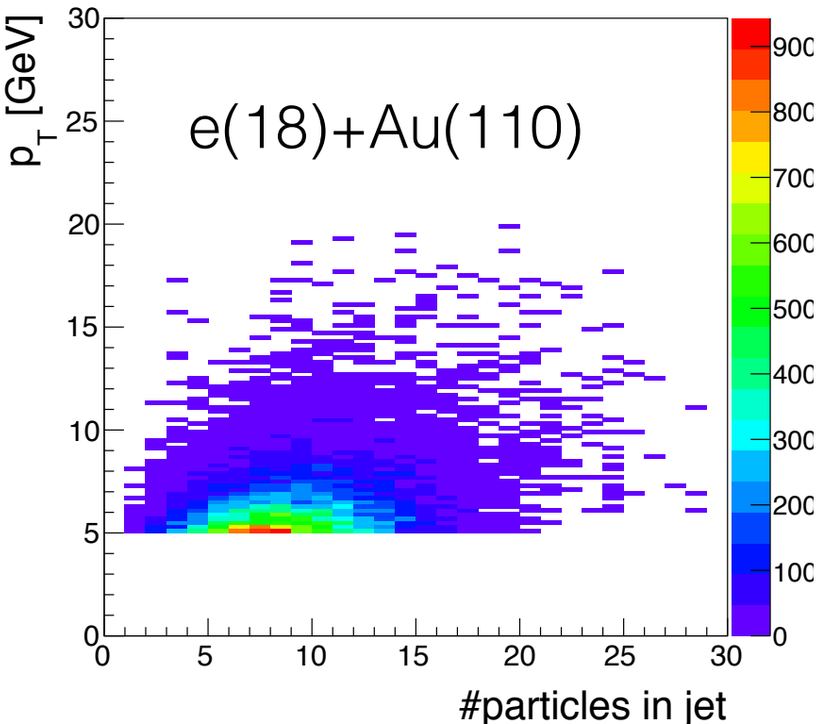

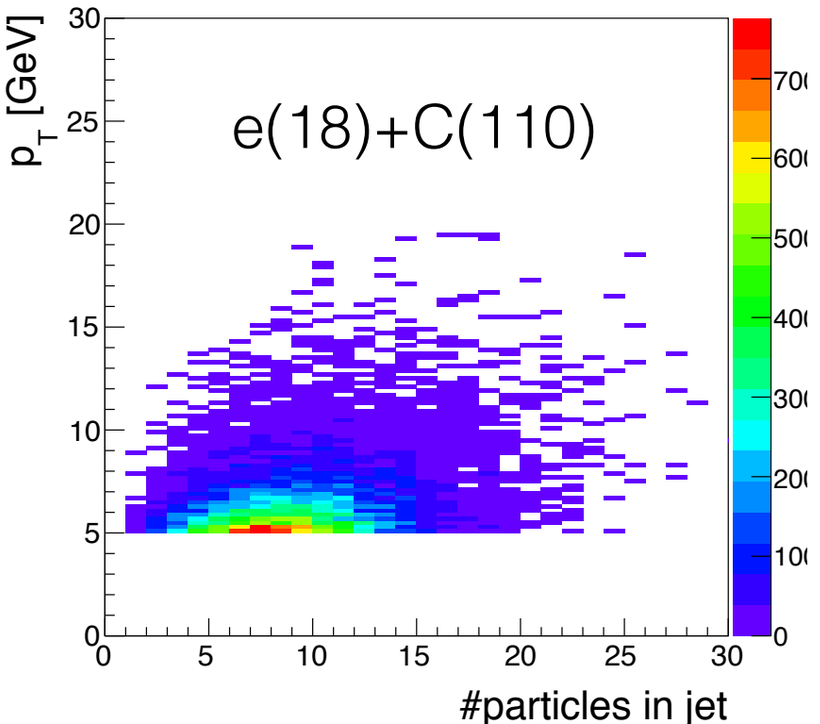

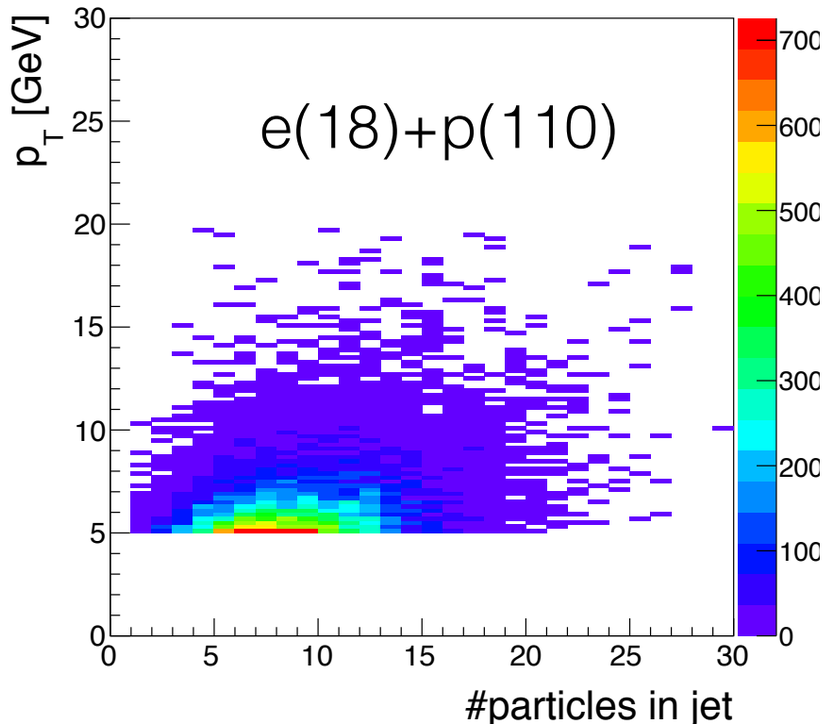

Way forward

- Looking into effects of nuclear shadowing on jets in eA collisions

- Will be implementing the observable Mriganka is looking into in eA collisions