First look at k_t measurements using di-jet correlations

Eleazar Cuautle[1], Rafael Díaz[2], Isabel Domínguez[1], Guy Paić[1] y Andreas Morsch[3]

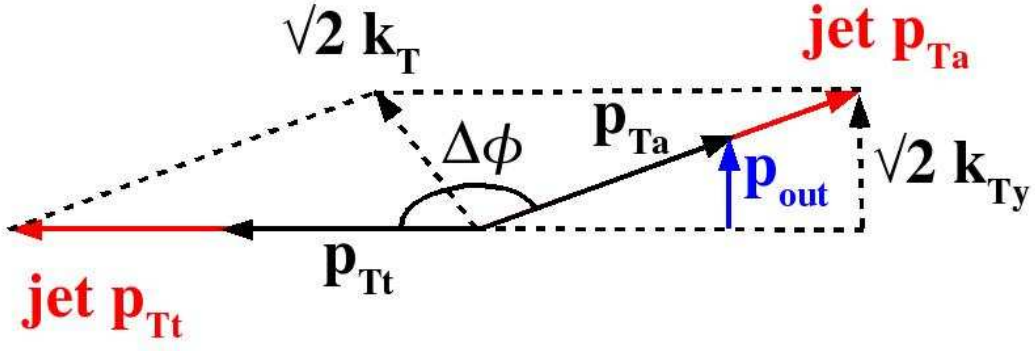
[1]Instituto de Ciencias Nucleares, UNAM, México

[2]Centro de Aplicaciones Tecnológicas y Desarrollo Nuclear, CEADEN, La Habana

[3]Departamento de Física, CERN, Ginebra, Suiza

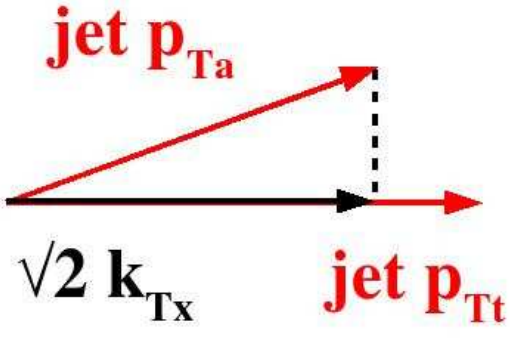
Intrinsic momentum k_T

$$< k_T^2 >= \frac{< p_T^2 >_{pair}}{2} =< k_T^2 >_{intrinsico} + < k_T^2 >_{soft} + < k_T^2 >_{NLO} \qquad (1)$$



- **Acoplanarity:** the transverse momentum of one jet does not lie in the plane determined by the transverse momentum of the second jet and the beam axes

$p_{out} = |p_{Ta}| sin\Delta\phi = \sqrt{2}k_{Ty}$



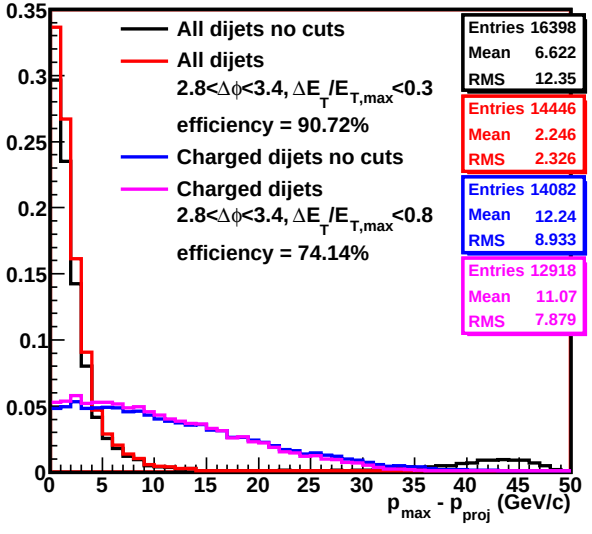
- **Momentum imbalance:** Partons p_T are not equal

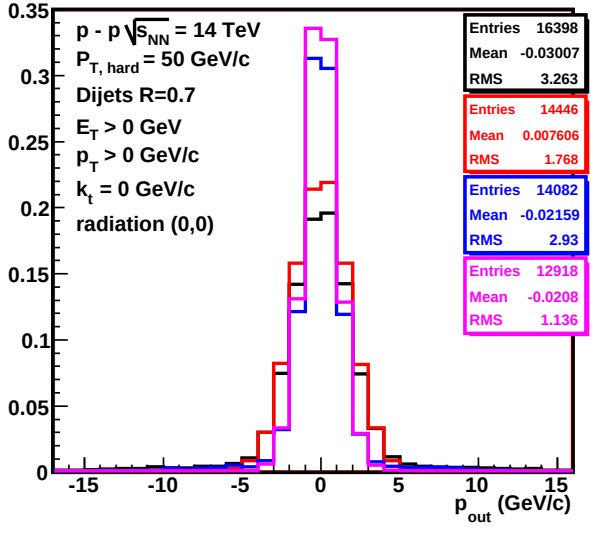
$p_{max} - p_{proj} = |p_{Tt}| - |p_{Ta} Proj(p_{Tt})| = \sqrt{2}k_{Tx}$

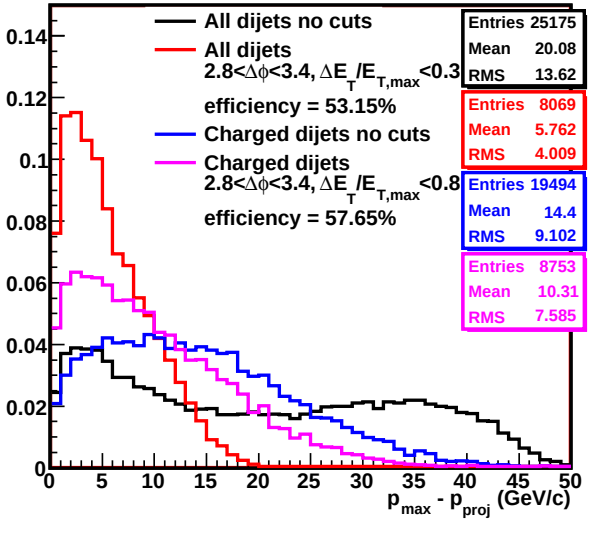
Monte Carlo Generation

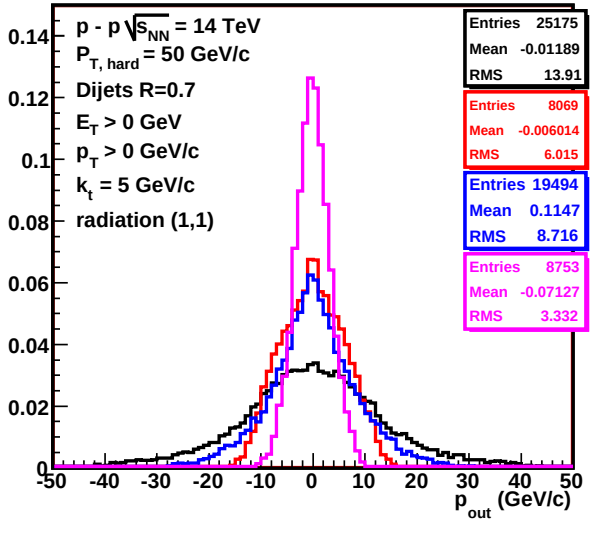
- **PYTHIA 6.2**
  - Proton - Proton
  - Centre mass energy: 14 TeV
  - Process types: kPyJets p_{Thard} = 50 GeV/c
  - k_T = 0, 5, 7.5, 10, 15 GeV/c
  - Initial/final state radiation
- **Cone Jet Finder Algorithm**
  - R<0.7
  - $|\eta|$<0.9
  - No p_T^{cut}
  - E_T>0 GeV
- **Real dijets**
  - All particles:
    $2.8 \text{ rad} < \Delta\phi < 3.4 \text{ rad}$
    $\Delta E_T / E_{Tmax} < 0.3$
  - Charged particles:
    $2.8 \text{ rad} < \Delta\phi < 3.4 \text{ rad}$
    $\Delta E_T / E_{Tmax} < 0.8$

Transverse momentum imbalance





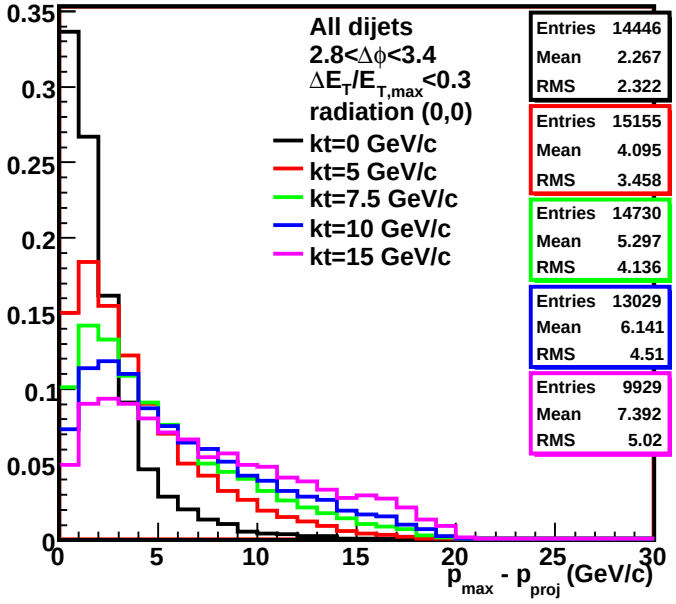


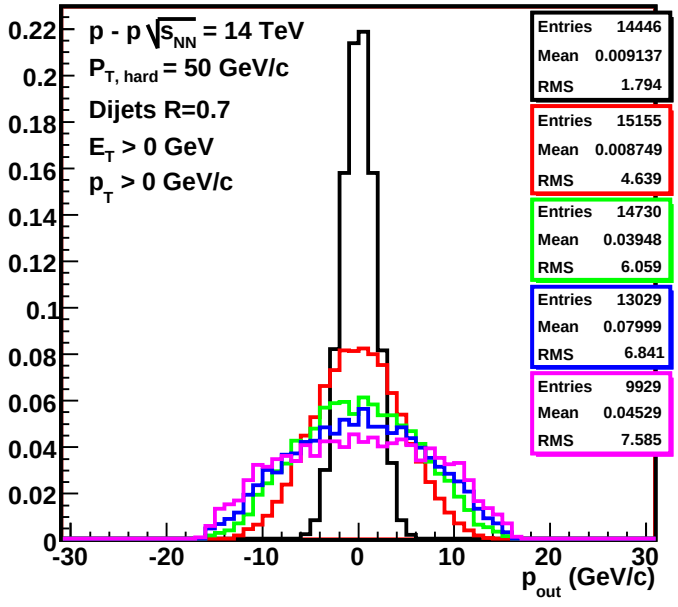


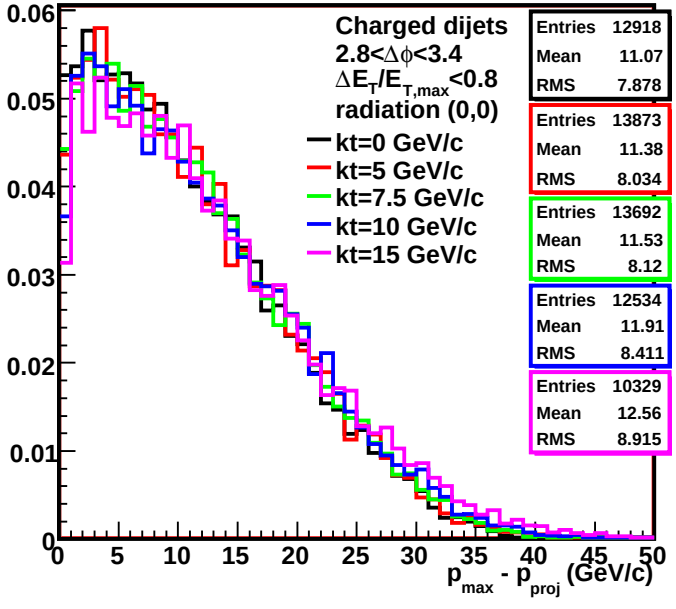
- Transverse momentum imbalance due to charged dijets reconstruction p_{max} - p_{proj} bigger than p_{out}

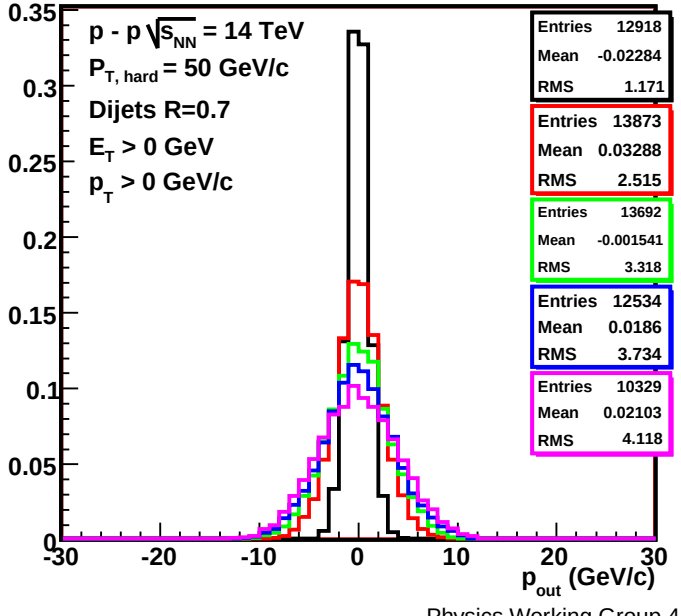
- k_T and radiation effects reduce efficiency

Dijets k_T = 0, 5, 7.5, 10, 15 GeV/c whitout initial and final radiation

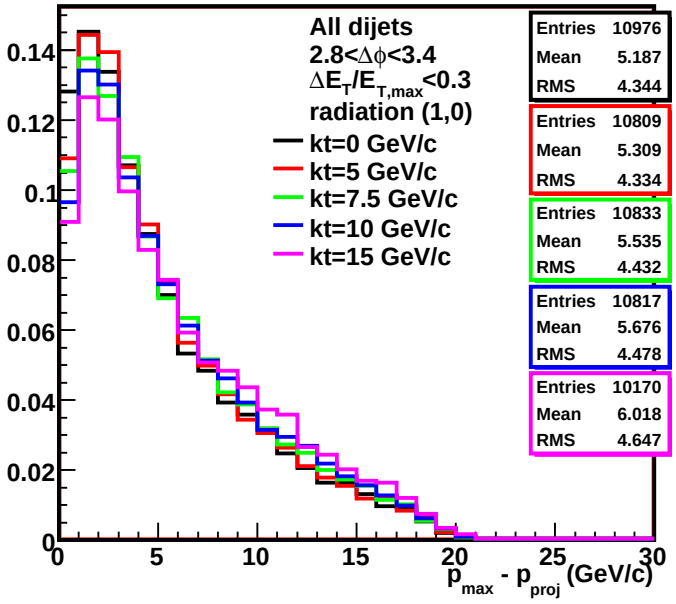


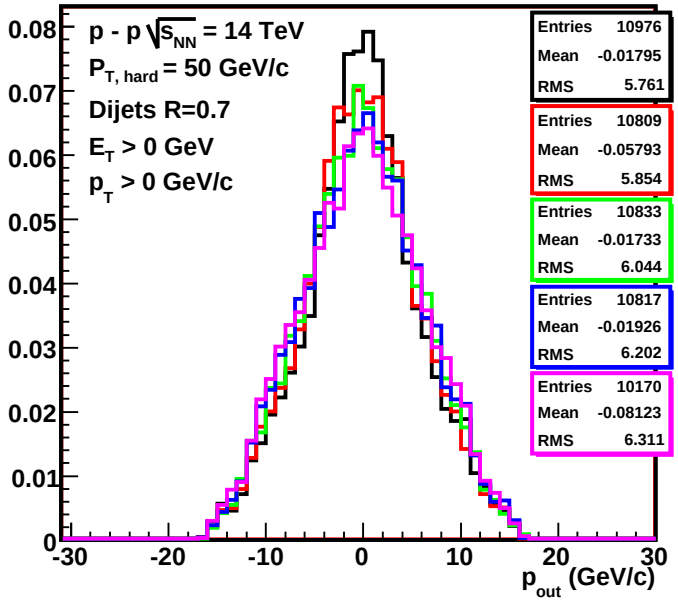


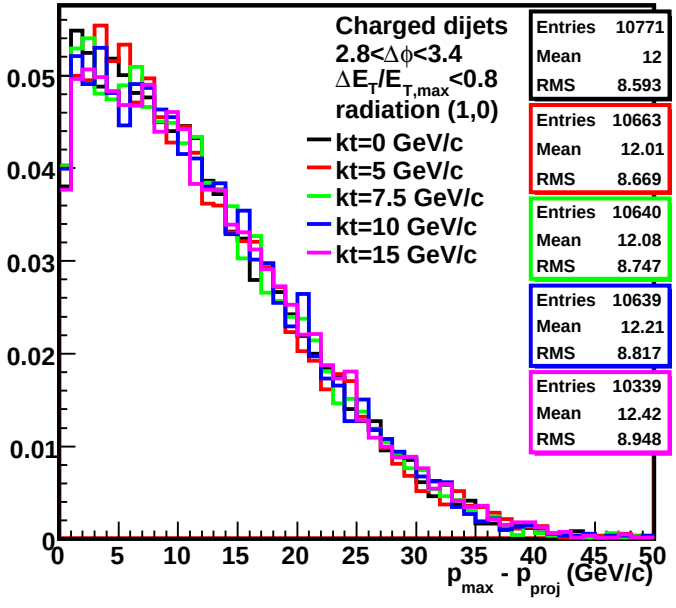


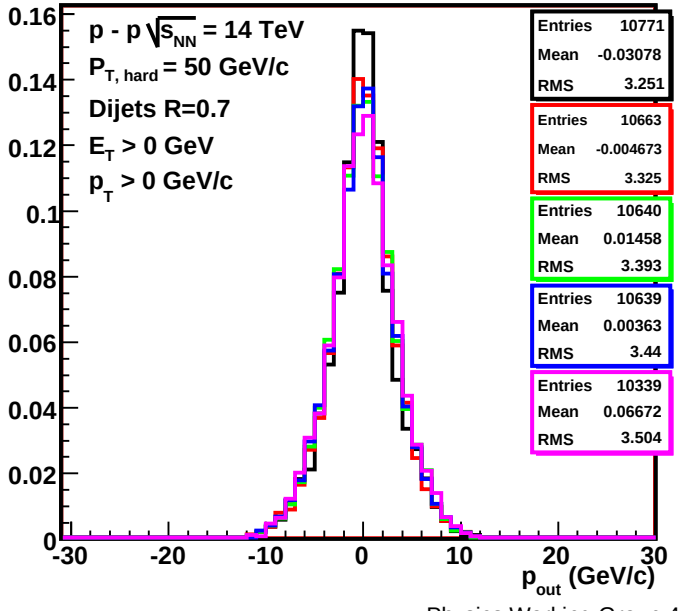


Dijets k_T = 0, 5, 7.5, 10, 15 GeV/c with initial radiation and without final radiation

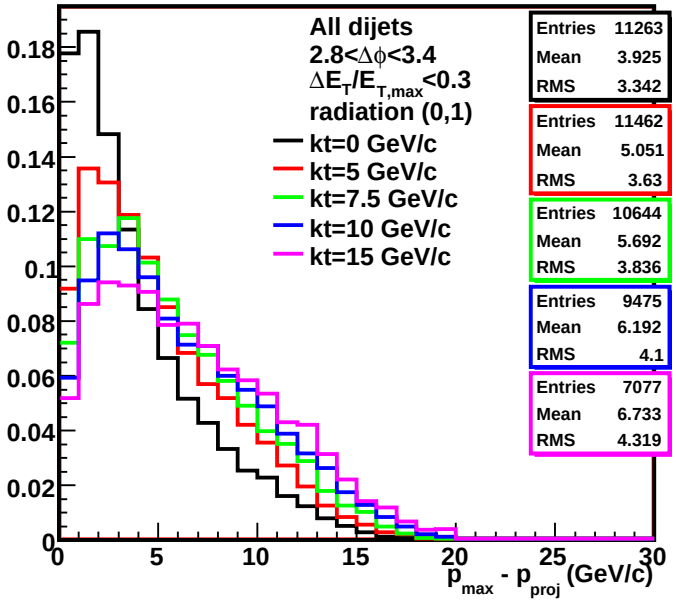


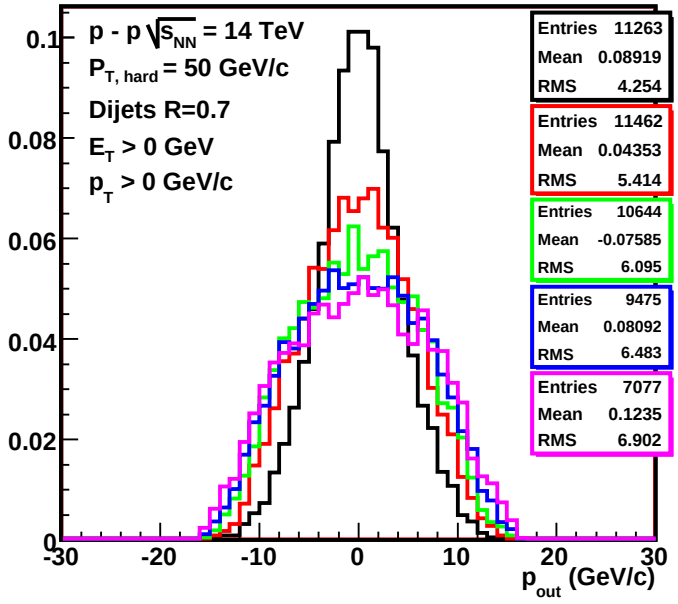


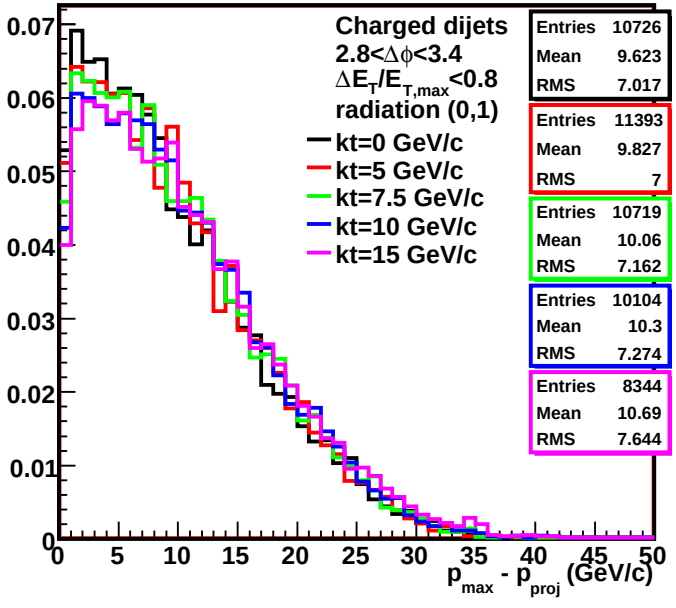


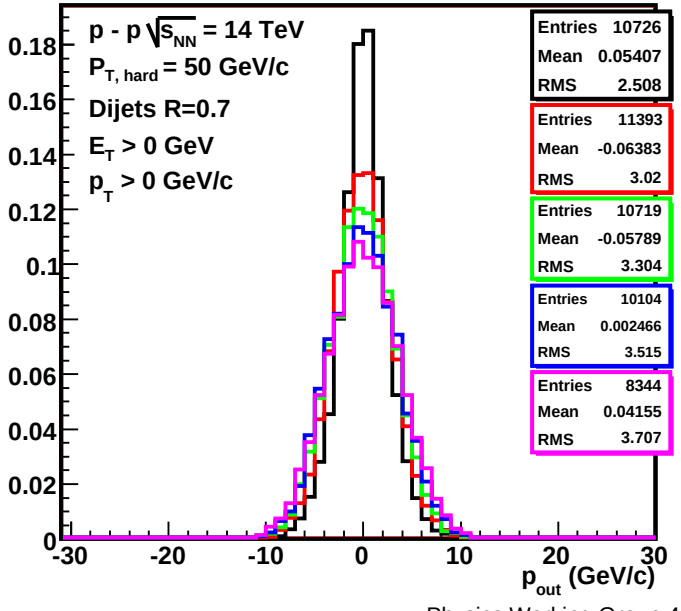


Dijets k_T = 0, 5, 7.5, 10, 15 GeV/c with final radiation and without initial radiation

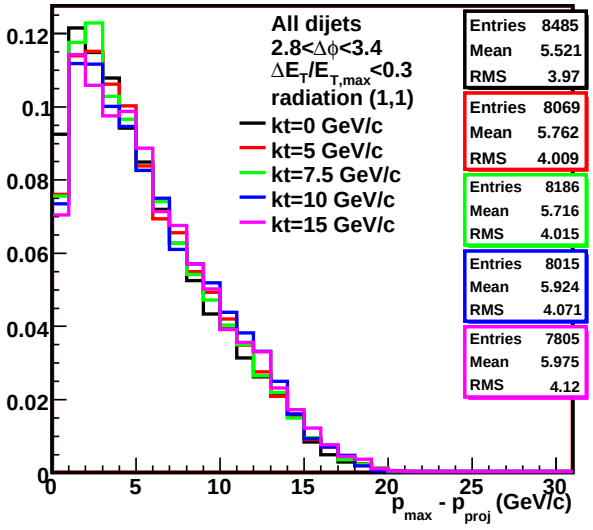


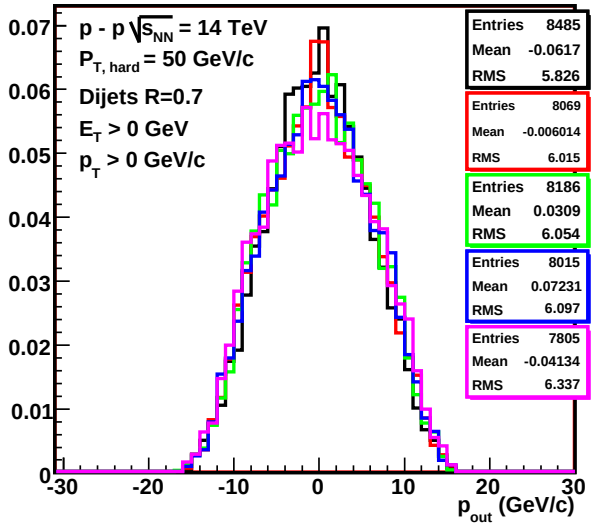


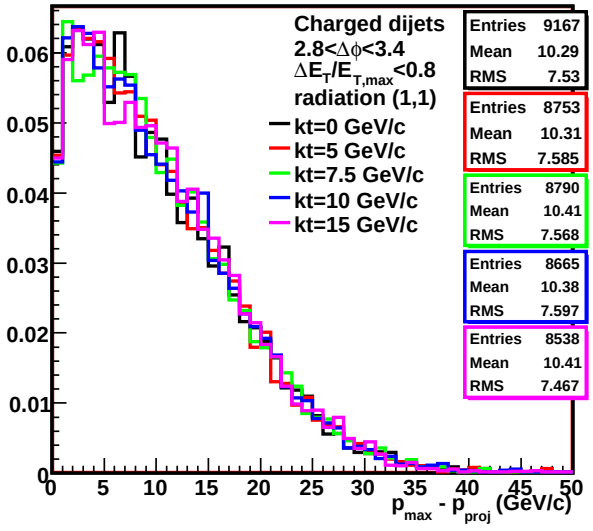


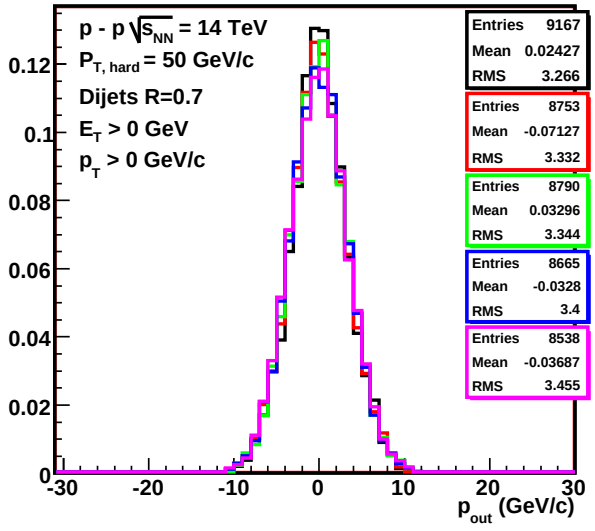


Dijets k_T = 0, 5, 7.5, 10, 15 GeV/c with initial and final radiation









Dijets k_T = 0, 5, 7.5, 10, 15 GeV/c with initial and final radiation R=0.2