Single track simulations

UPDATES

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Single track simulation

GOAL: debug the first version of the software. Cannot be used yet to draw conclusions on the performances of the CGEM

- CGEMBoss software 6.6.5.b and Boss version 665p01
- All detectors included in the simulation
- "fixpt" generator used to generate single particle tracks
- 10000 protons, muons, kaons, electrons and pions
  - pt=(0.1, 0.15, 0.2, 0.3, 0.7) GeV/c
  - -0.93<cos(theta)<0.93
- **Difference in Reconstruction:**
  - 665p01: #include "$MDCXRECOROOT/share/jobOptions_MdcPatTsfRec.txt" (Runge-Kutta)
  - CGEMBoss: #include "$MDCXRECOROOT/share/jobOptions_MdcPatTsfRec_NoRK.txt"
- Observables:
  - pt reco
  - pt reco vs. theta
  - POCA after the Kalman fit

NOTE

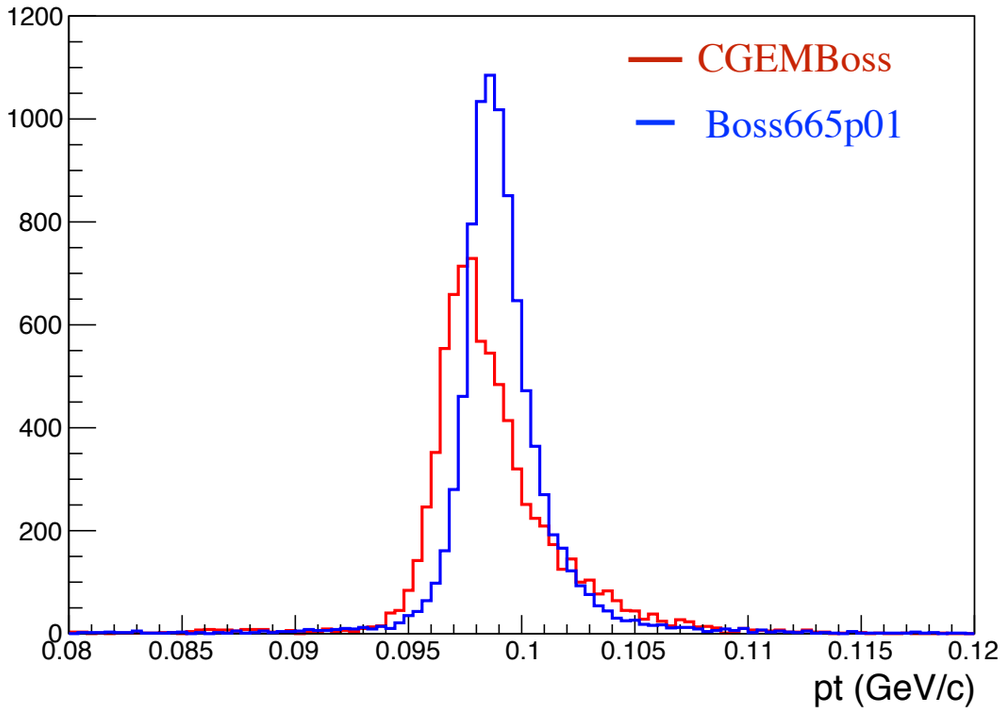
- **CGEMBoss: the observables before the kaman fit are the results of combination between CGEM and ODC. This means that cannot directly compare these variables**

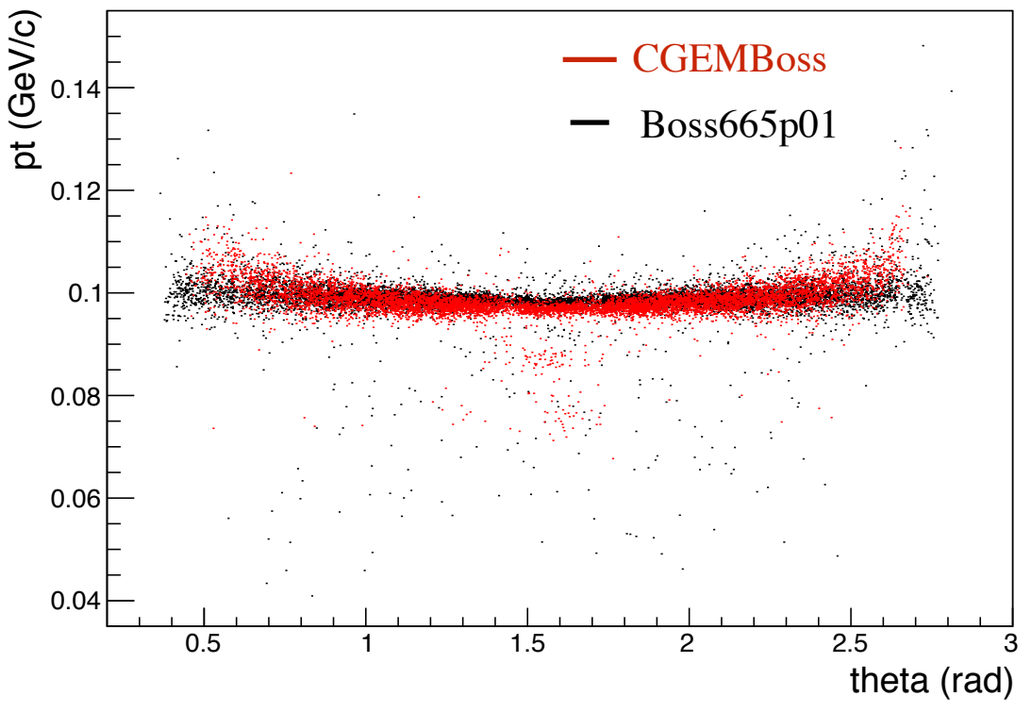
- **Bugs fixed in the simulation (non uniform magneti field setting)**
  - **old setting: BesSim.Field =1**

Muons: pt reco

Before Kalman fit pt=100 MeV

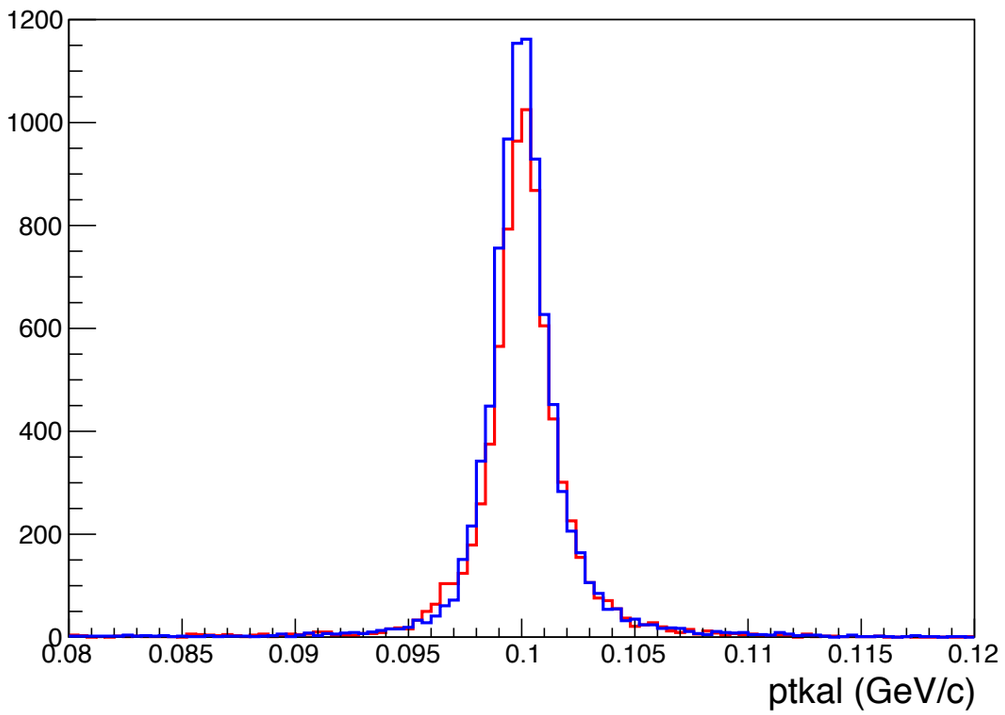
- RK fit for Boss665p01
- No global fit in CgemBoss

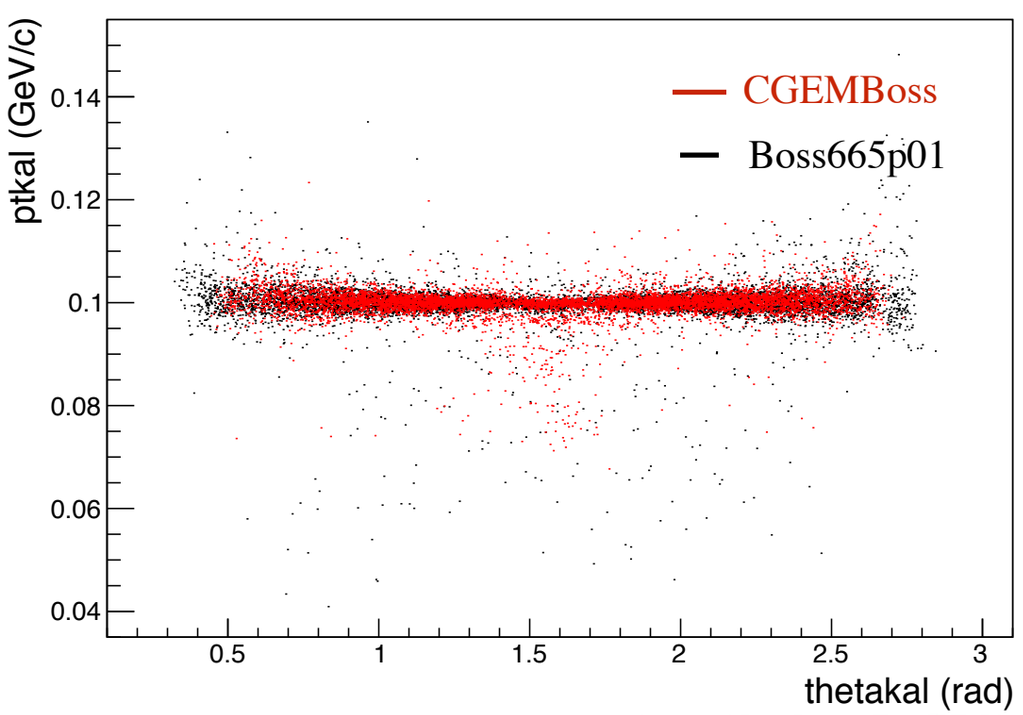




After Kalman fit pt=100 MeV

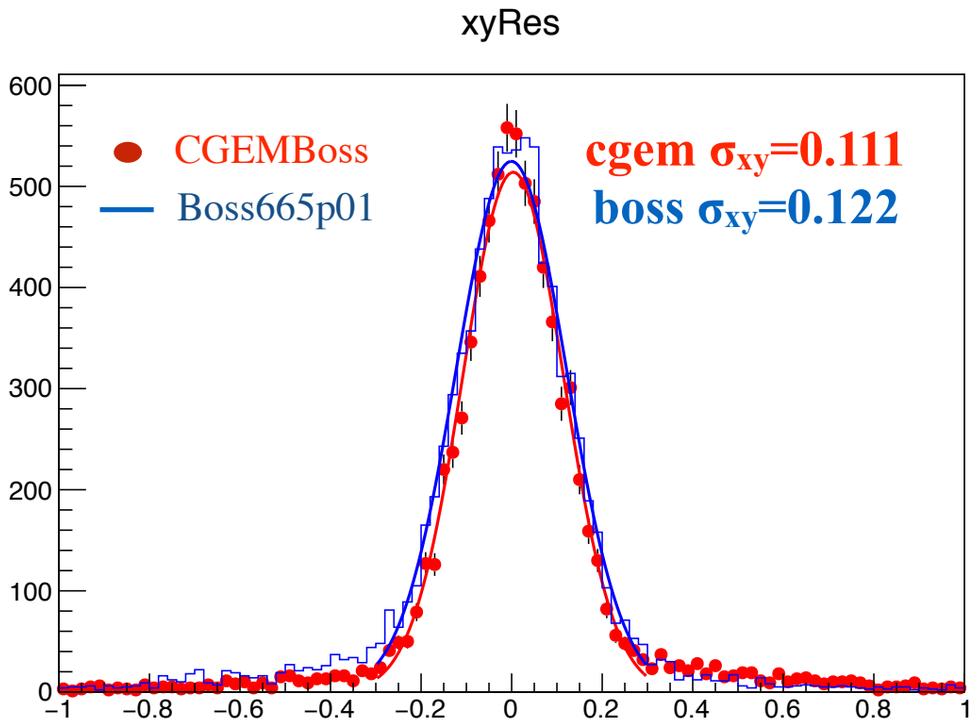
Good agreement after Kalman fit

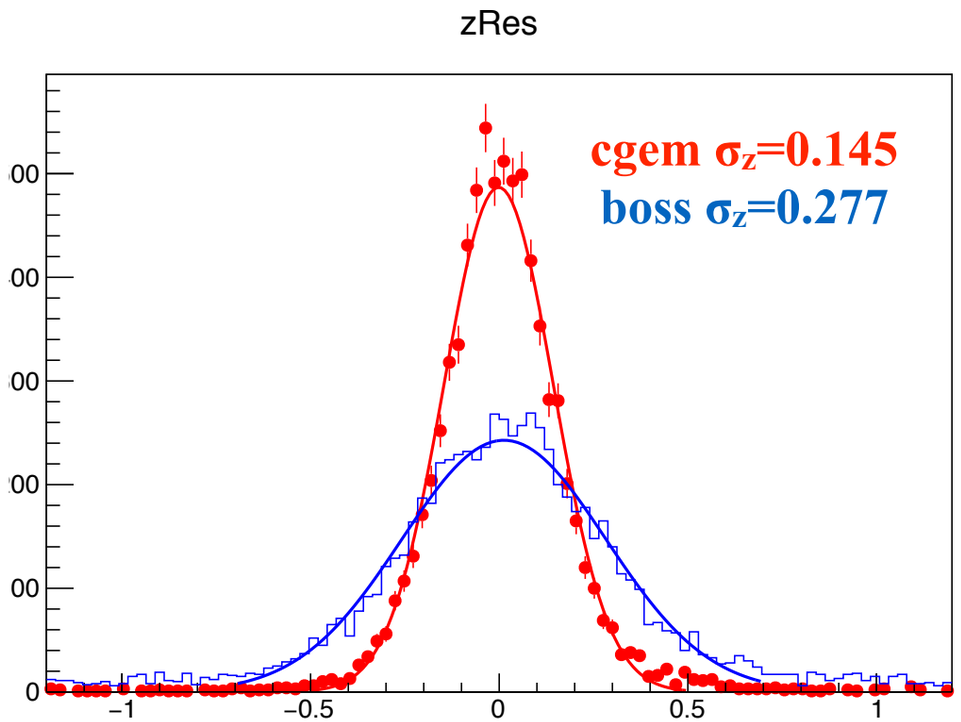




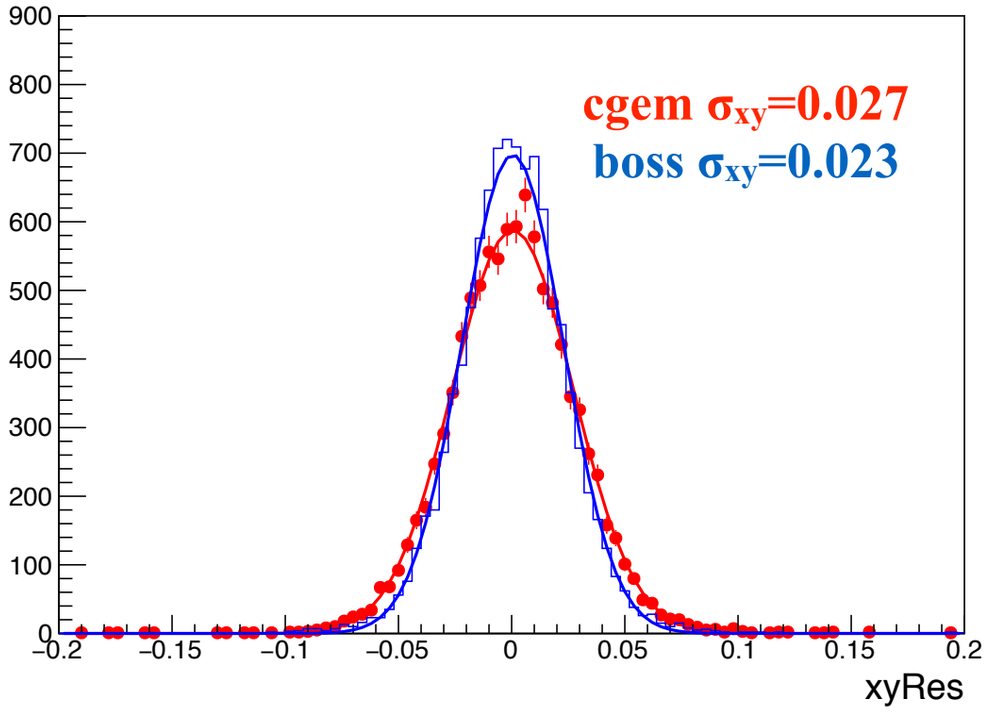
Vertex resolution

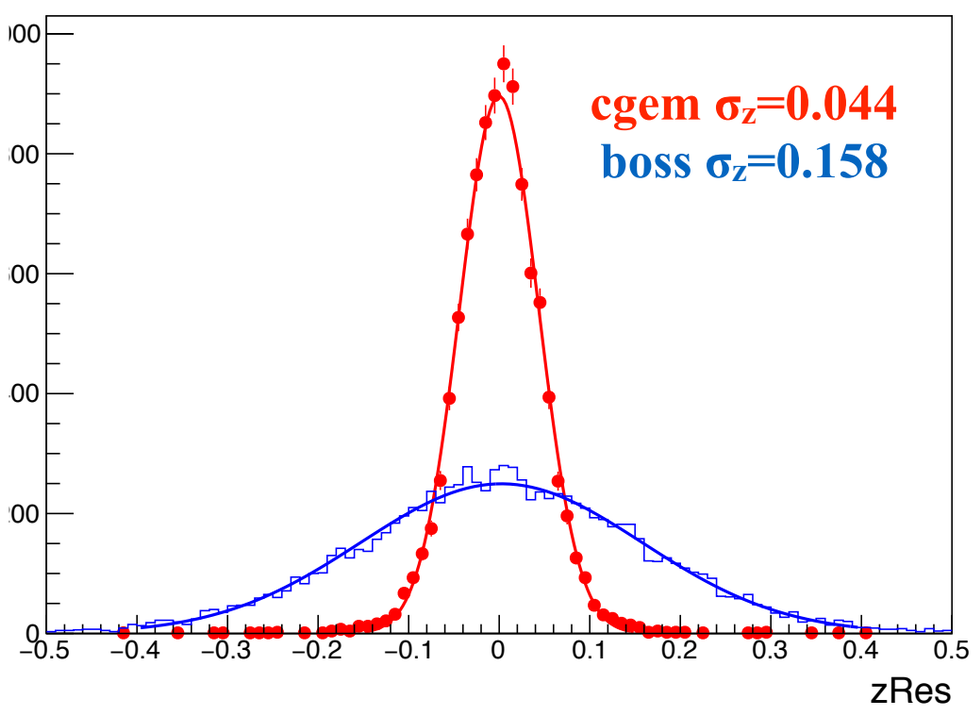
MUONS:
pt=100 MeV



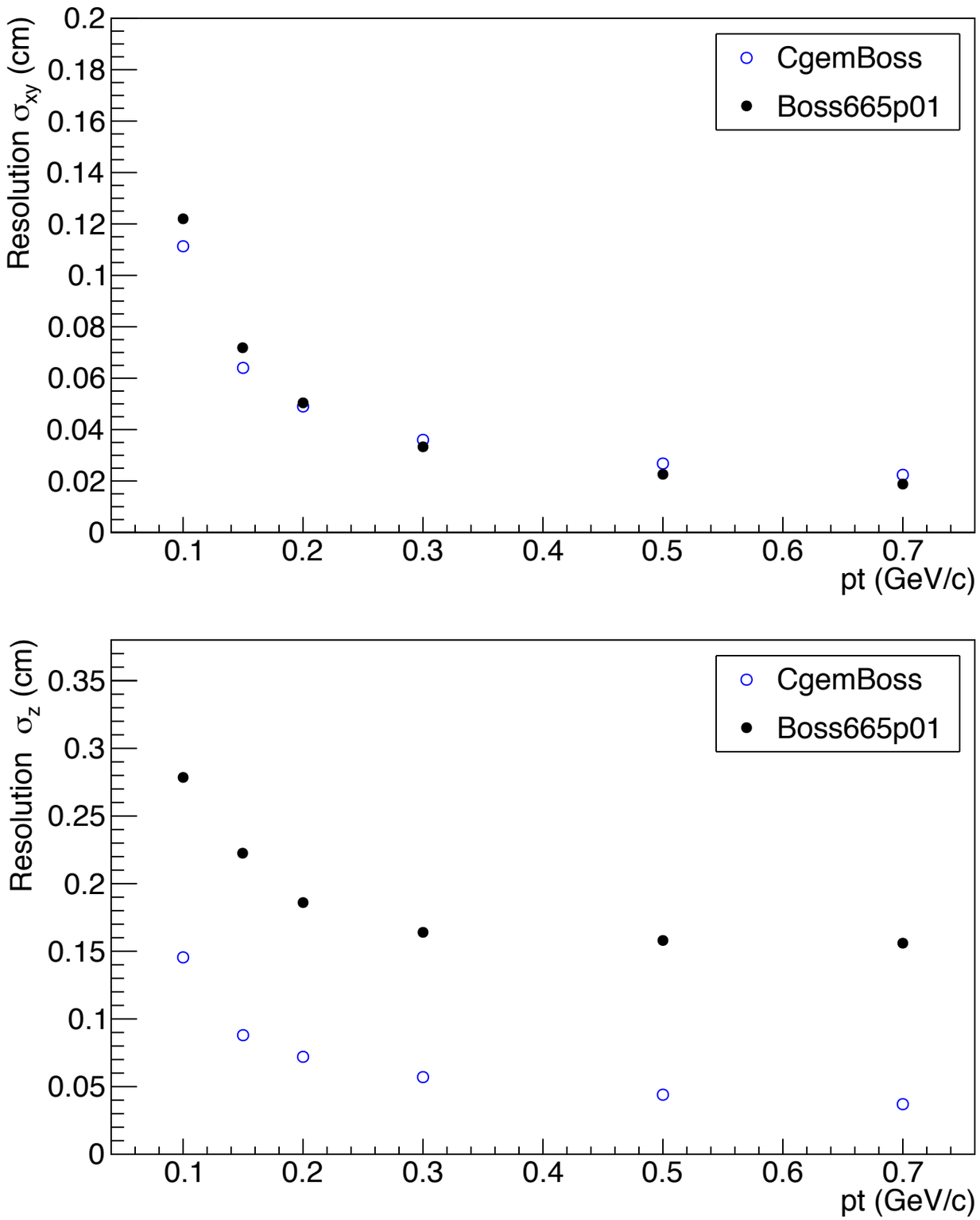


MUONS:
pt=500 MeV

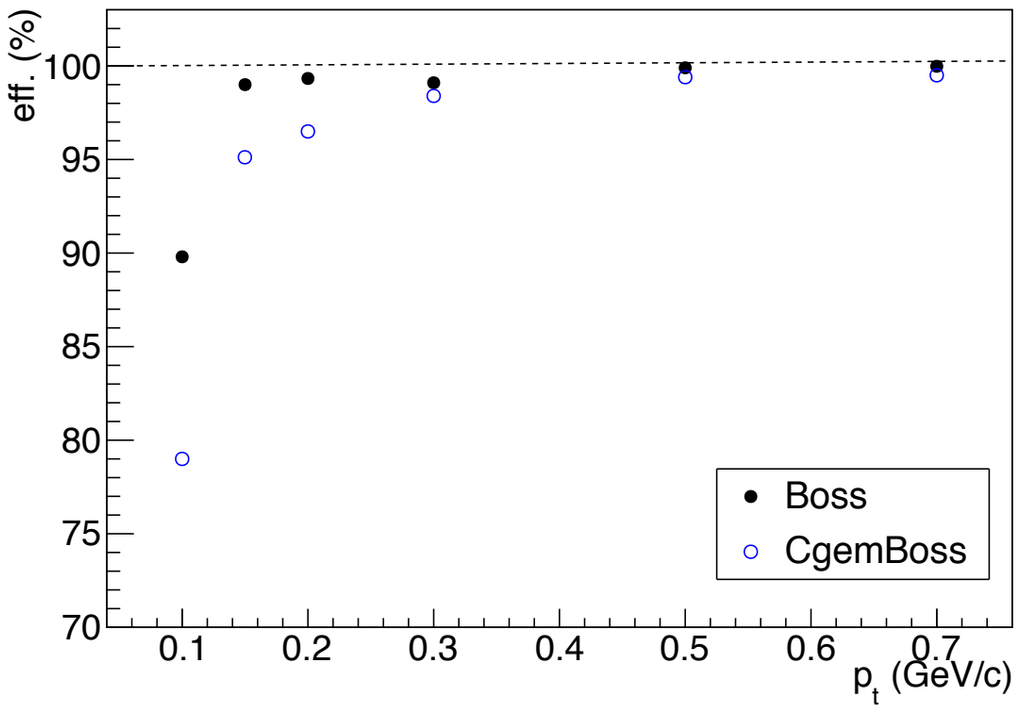




MUONS: summary



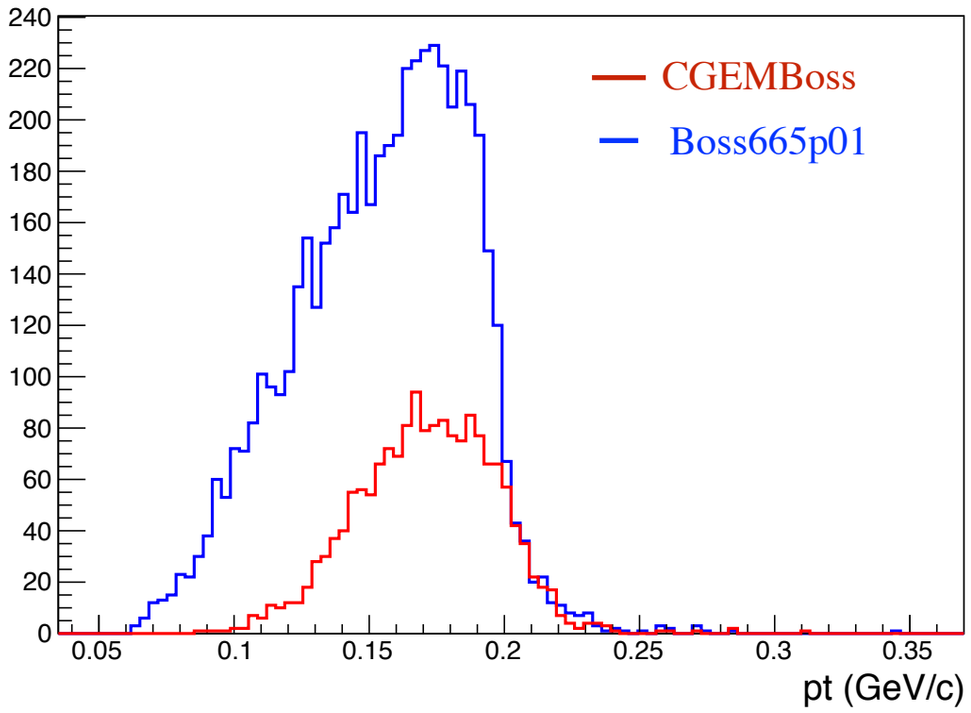
- **CgemBoss efficiency < Boss efficiency**
- **Vertex resolution along z direction better for CGEM (by a factor of about 3)**
- **Consistency of the vertex resolution in the XY plane**

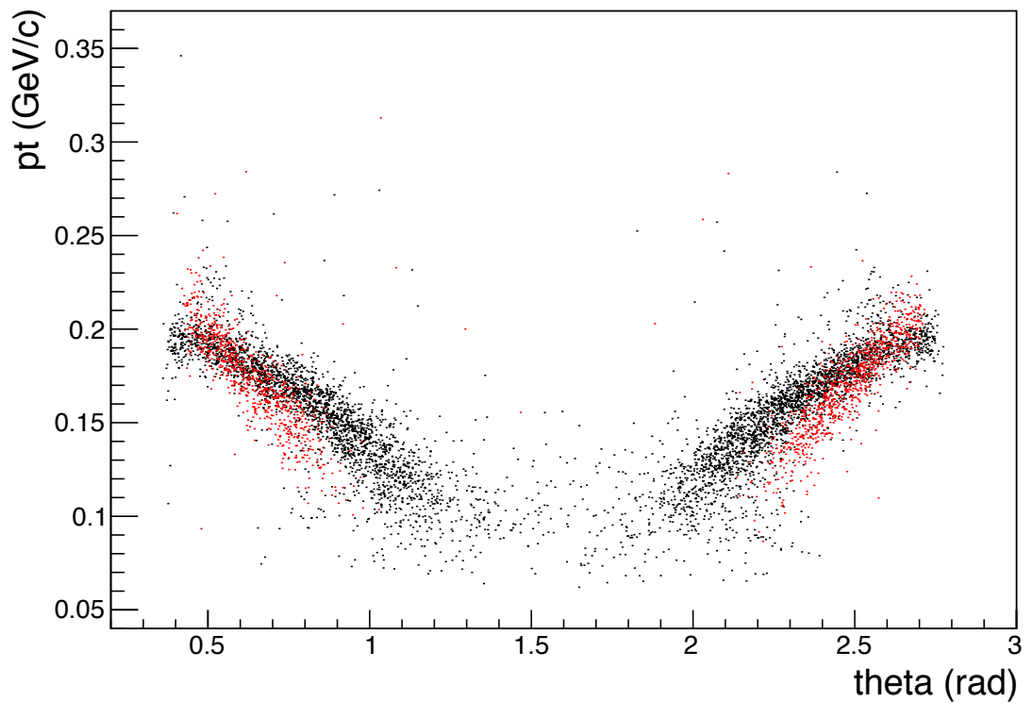


Protons

Protons: pt = 200 MeV

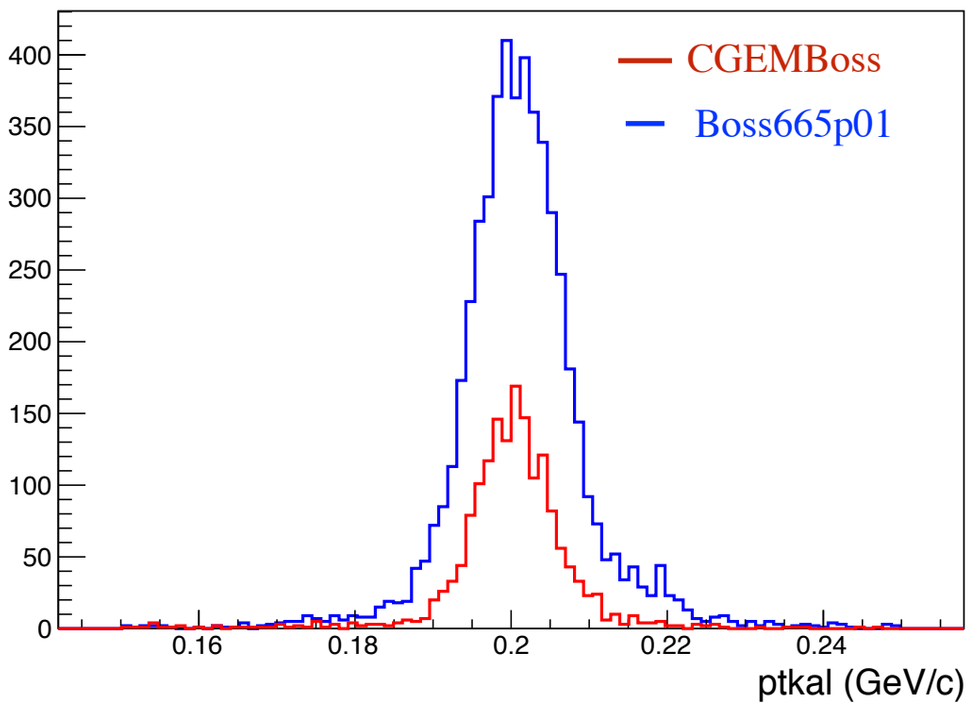
Before Kalman fit pt=200 MeV

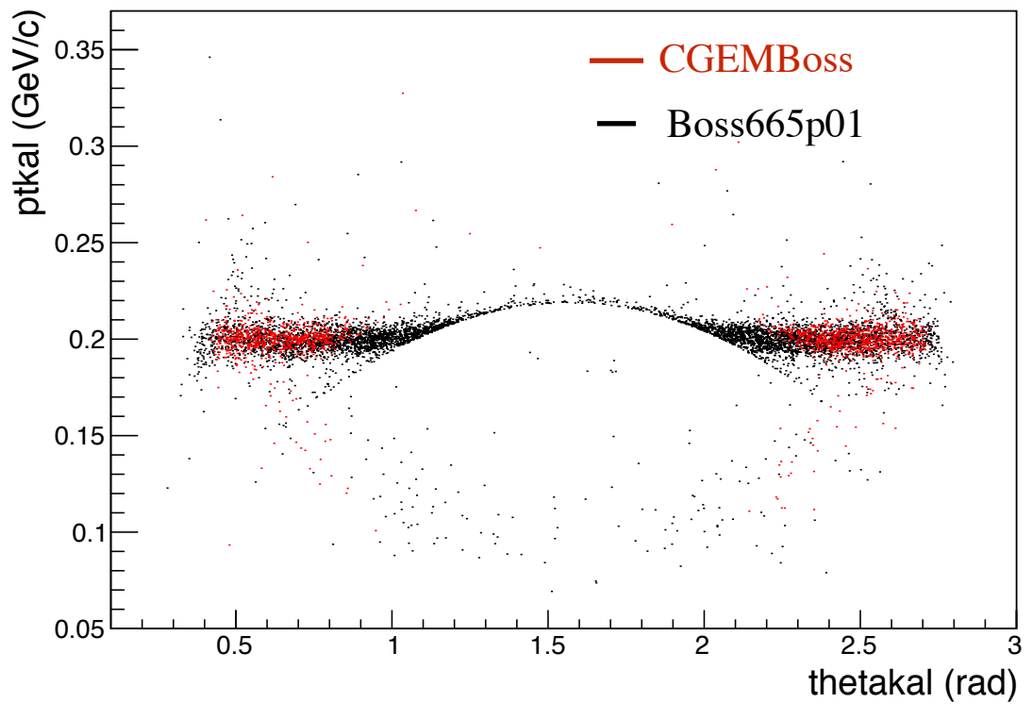




After Kalman fit pt=200 MeV

Good agreement after Kalman fit

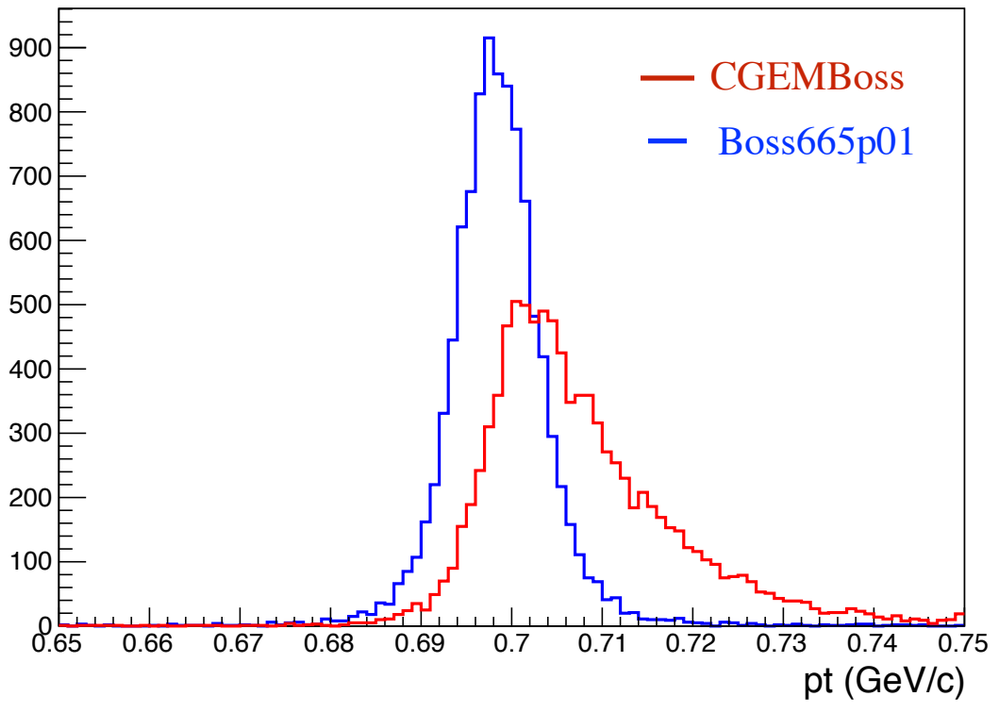


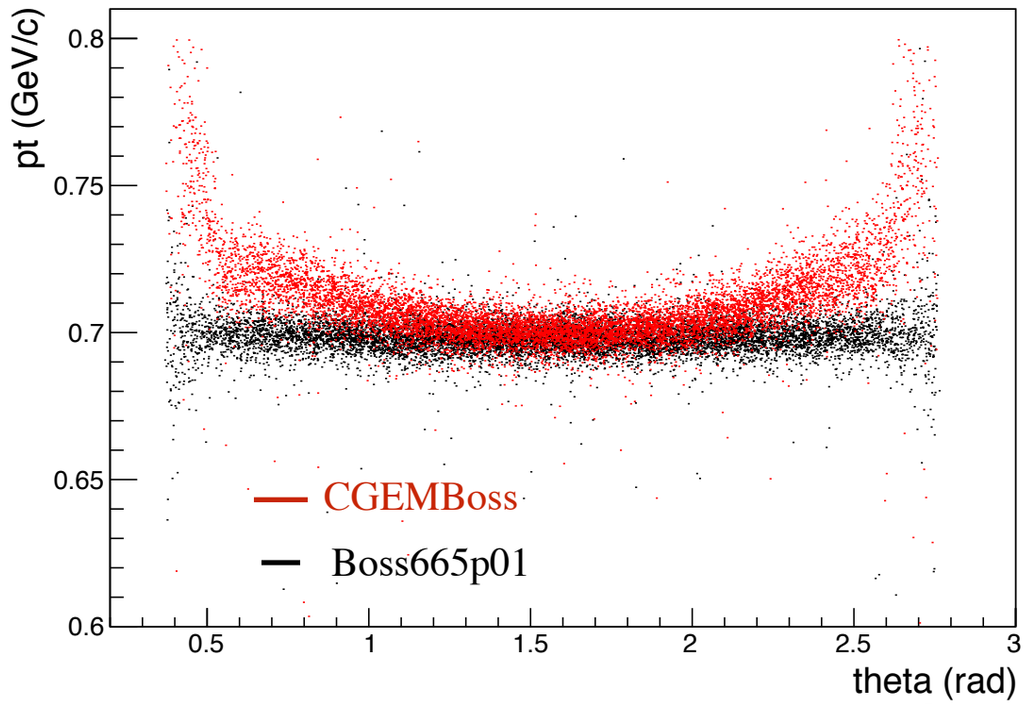


Protons: pt = 700 MeV

Before Kalman fit pt=700 MeV

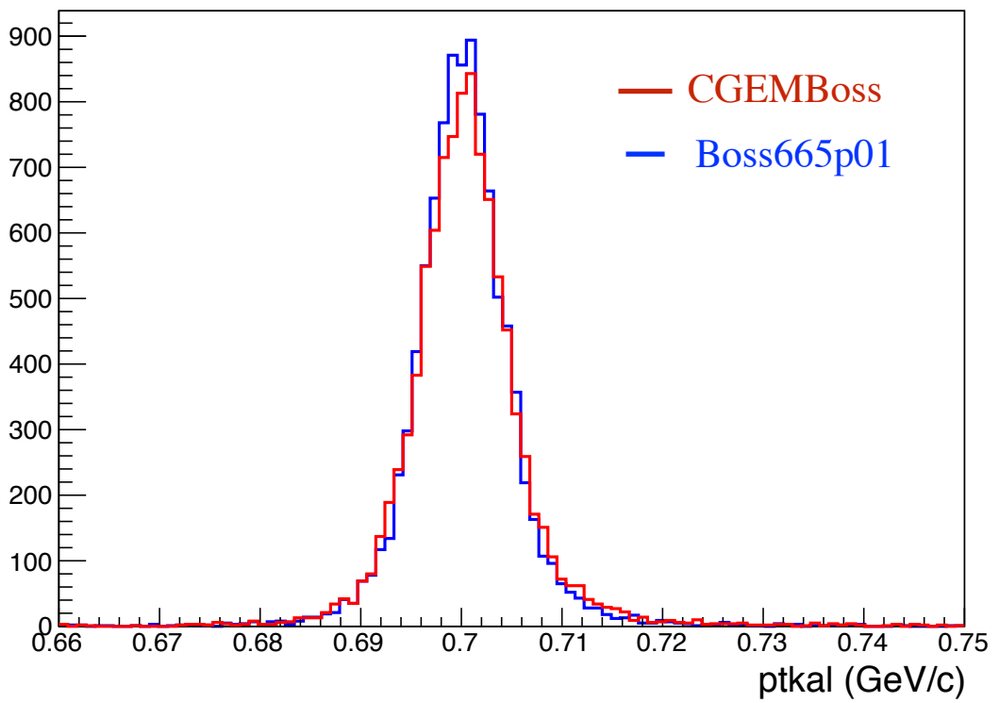
- RK fit for Boss665p01
- No global fit in CgemBoss

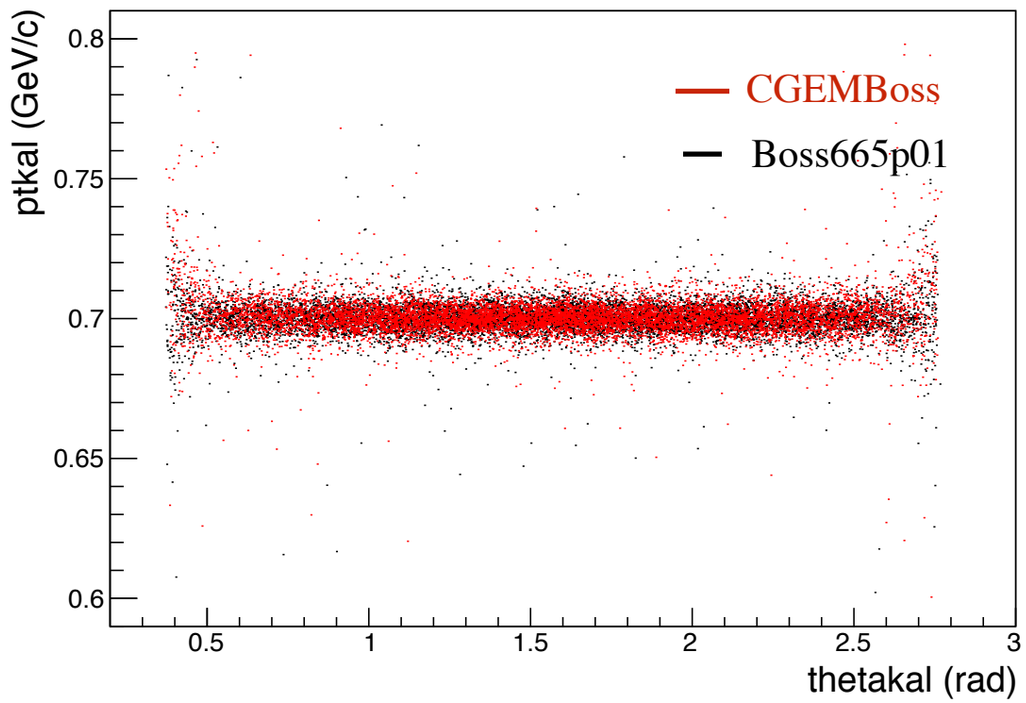




After Kalman fit pt=700 MeV

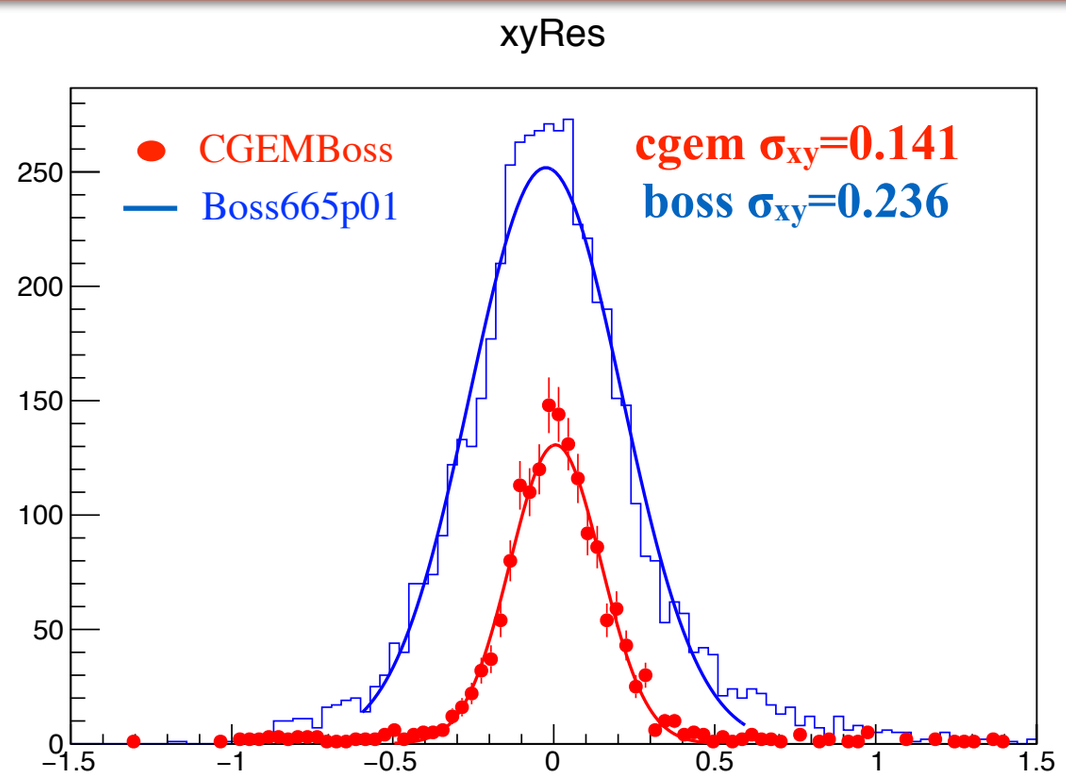
Good agreement after Kalman fit

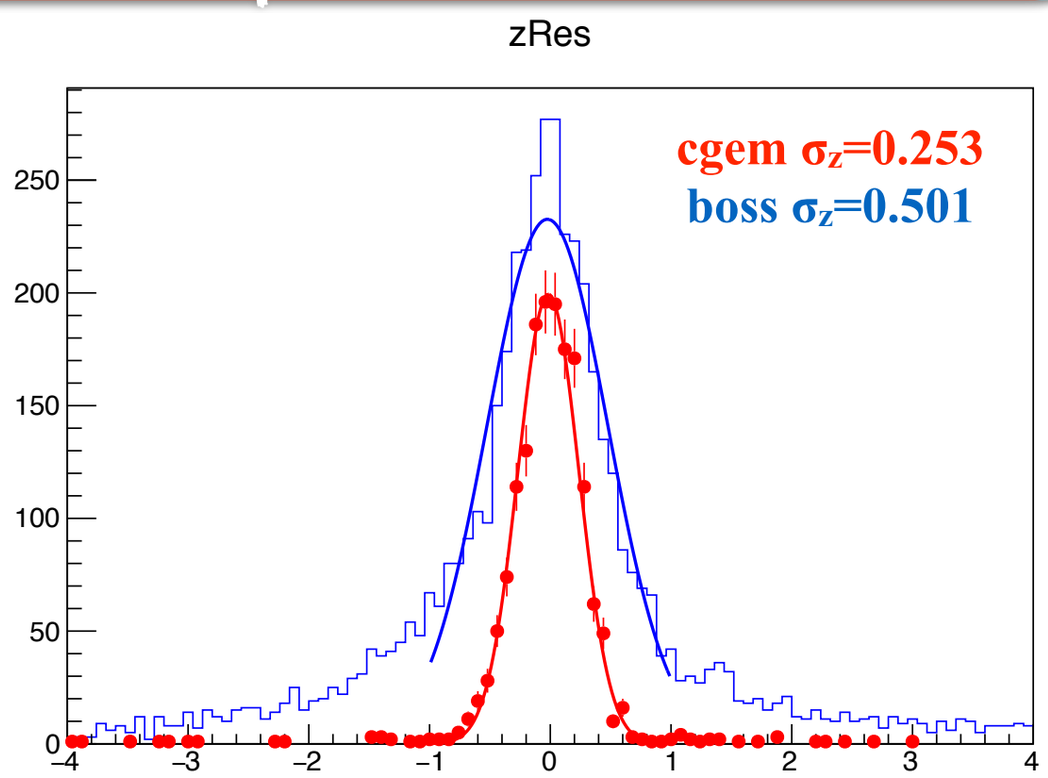




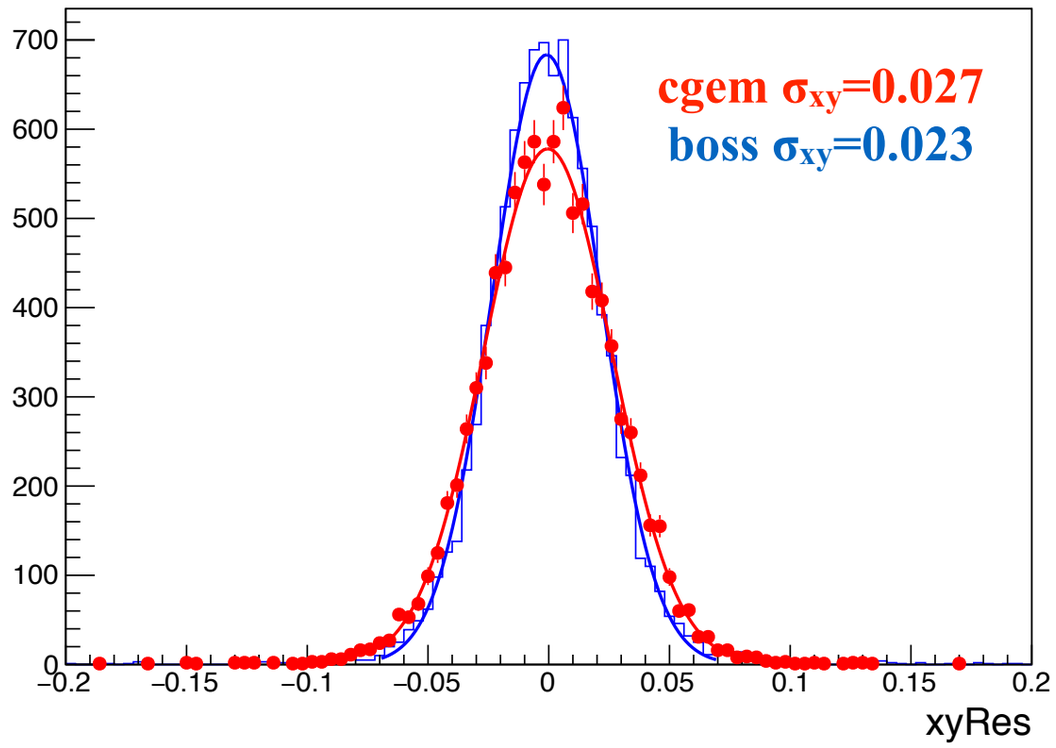
Vertex resolution for protons

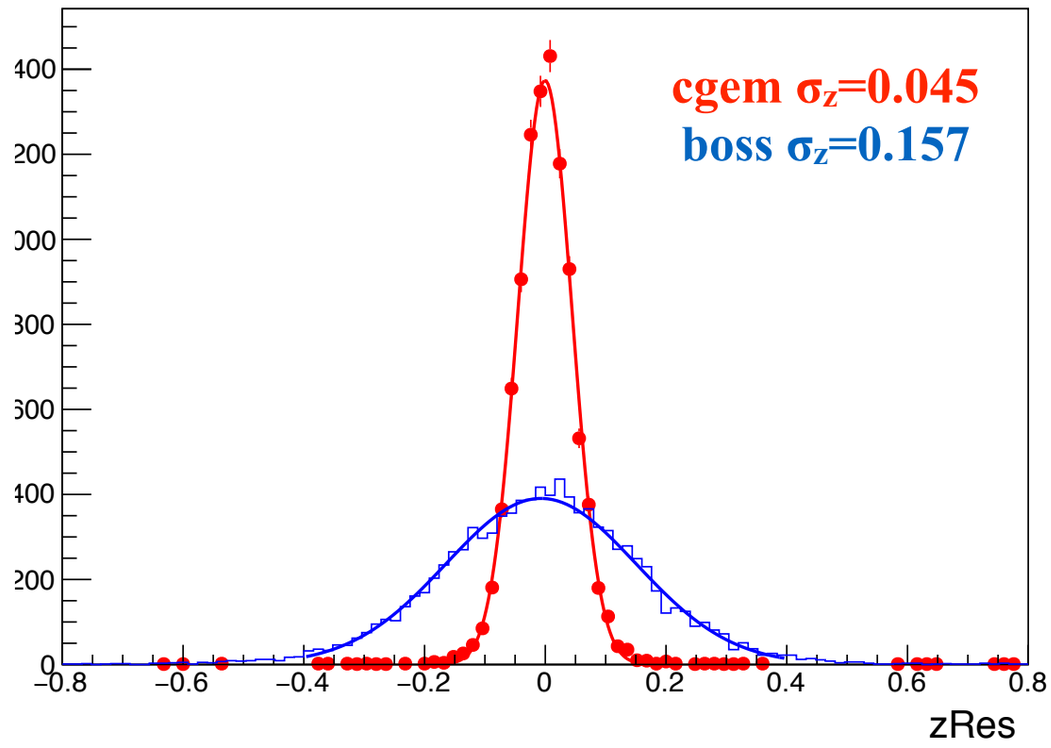
Protons:
pt=200 MeV



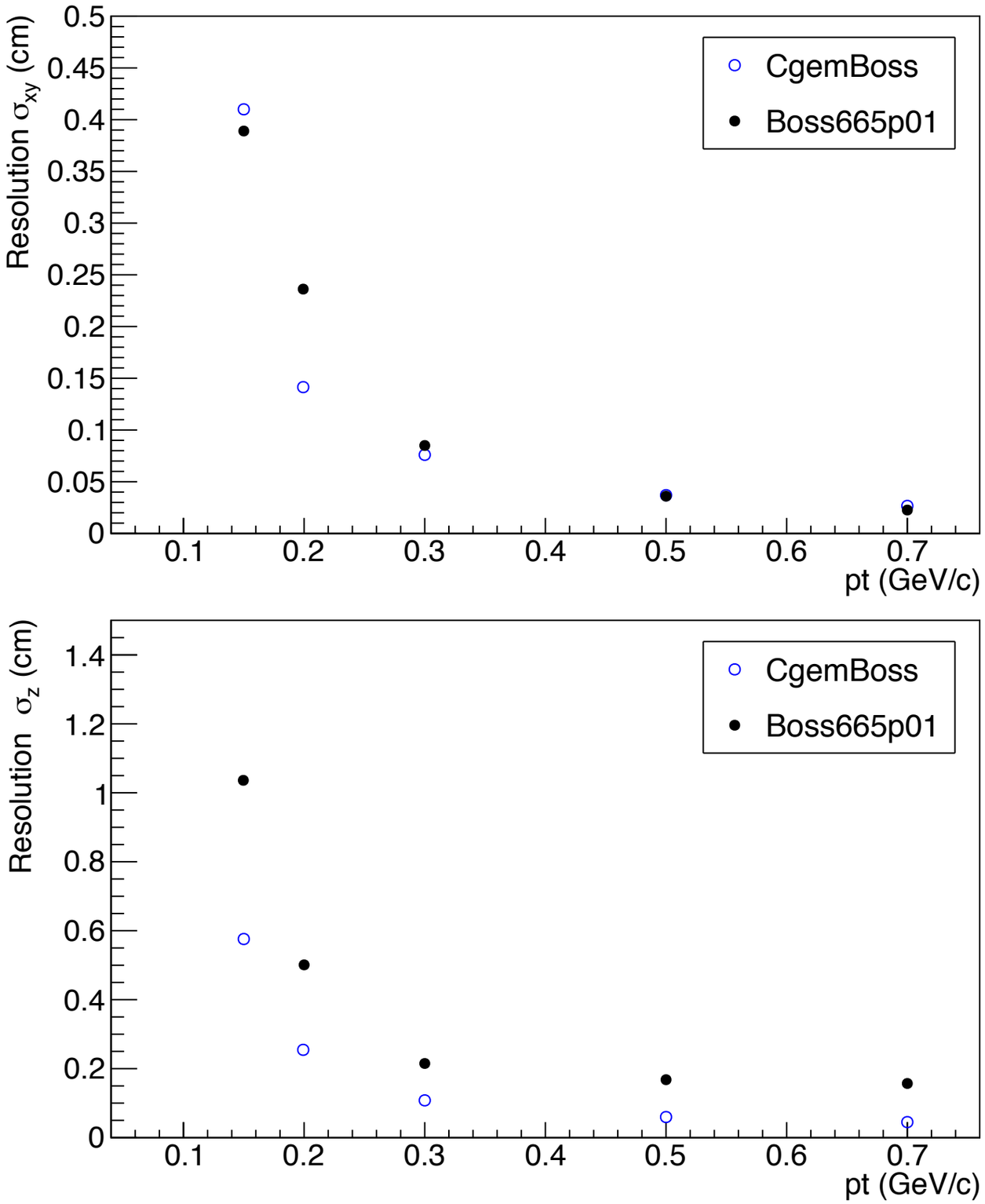


Protons:
pt=700 MeV

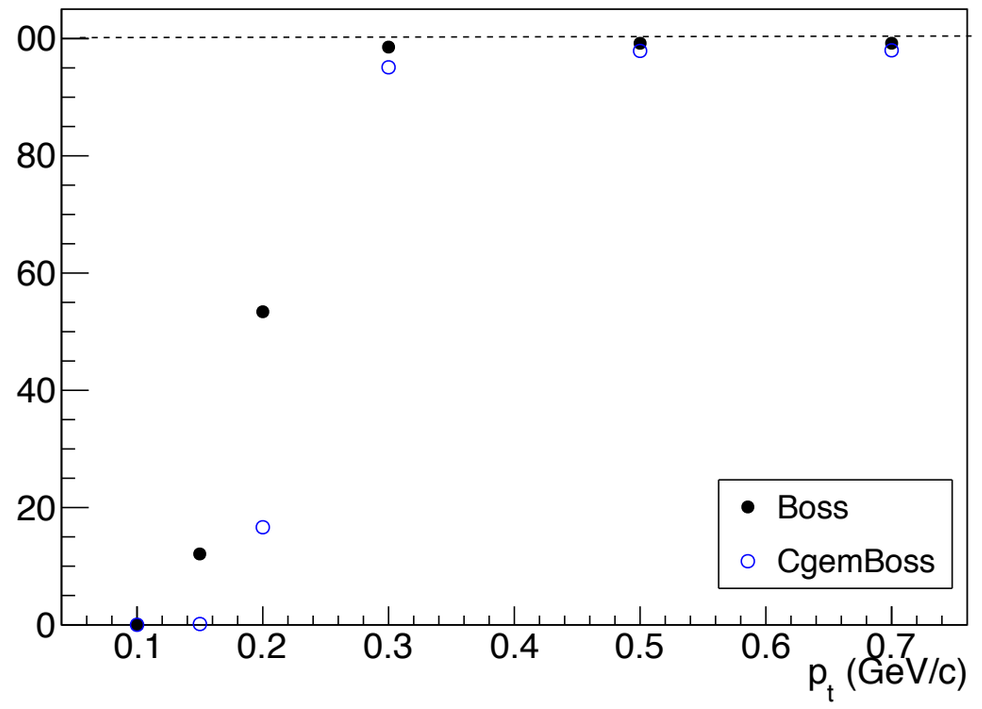




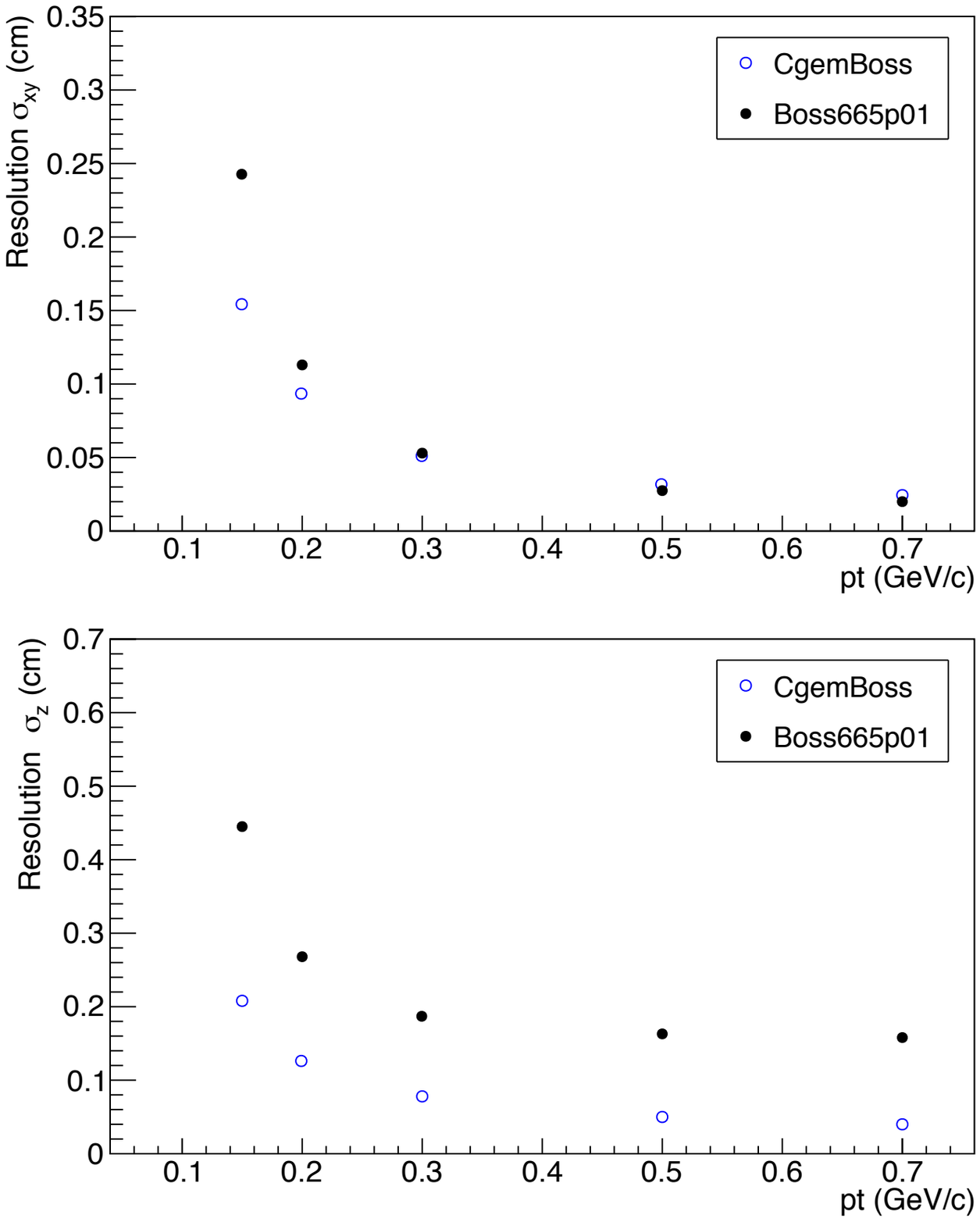
PROTONS: summary



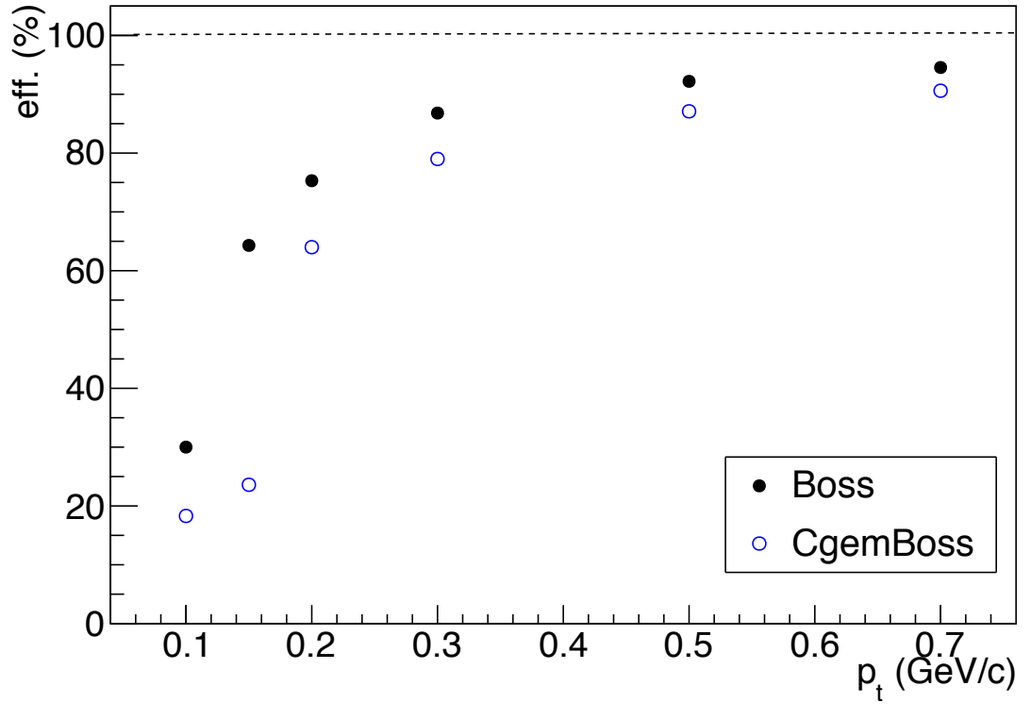
- **CgemBoss efficiency < Boss efficiency**
- **Vertex resolution along z direction better for CGEM (by a factor of about 3)**
- **Consistency of the vertex resolution in the XY plane for pt > 300 MeV/c**



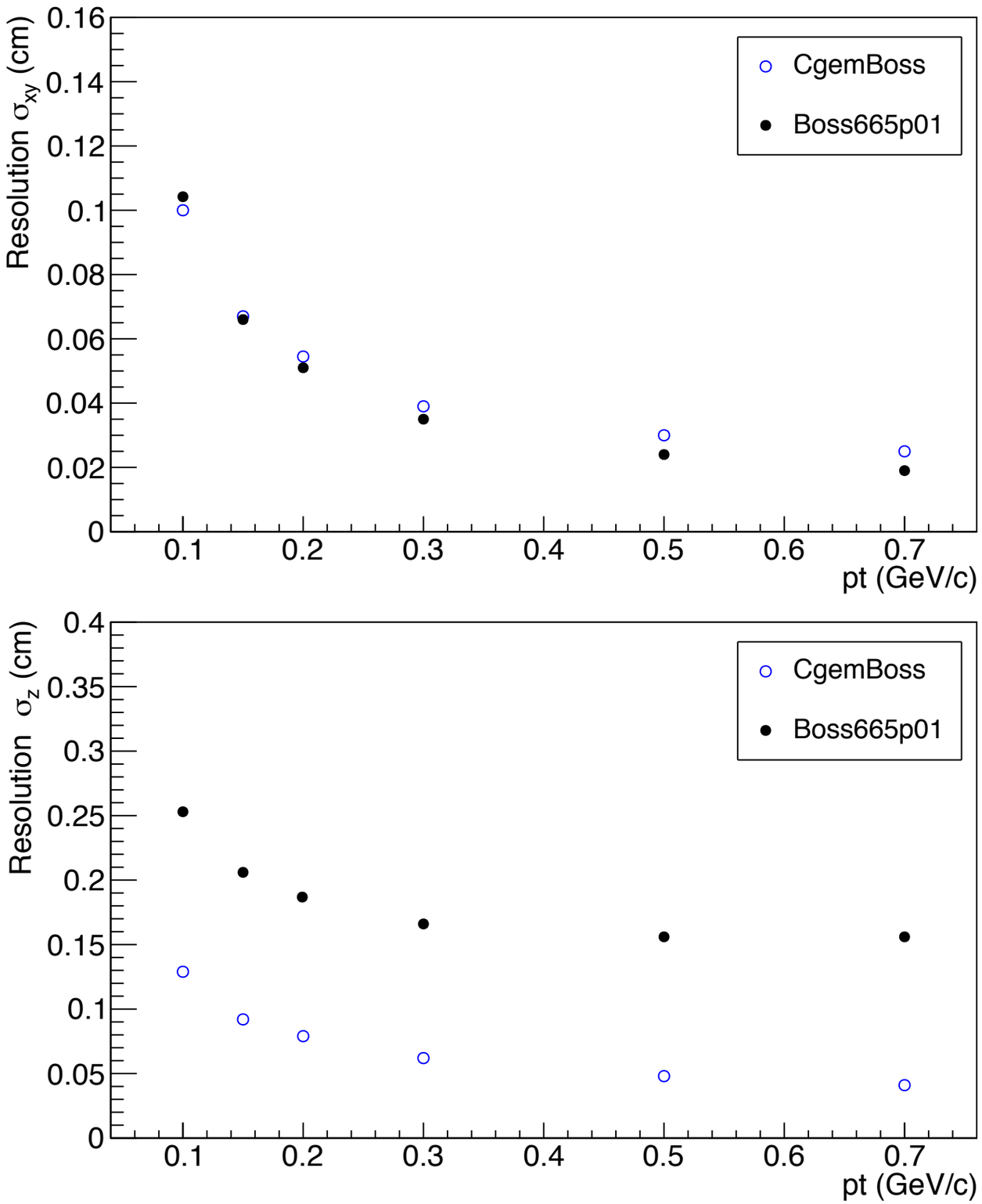
KAONS: summary



- **CgemBoss efficiency < Boss efficiency**
- **Vertex resolution along z direction better for CGEM (by a factor of about 3)**
- **Good consistency of the vertex resolution in the XY plane for pt > 300 MeV/c**



Electrons: summary



- **CgemBoss efficiency < Boss efficiency**
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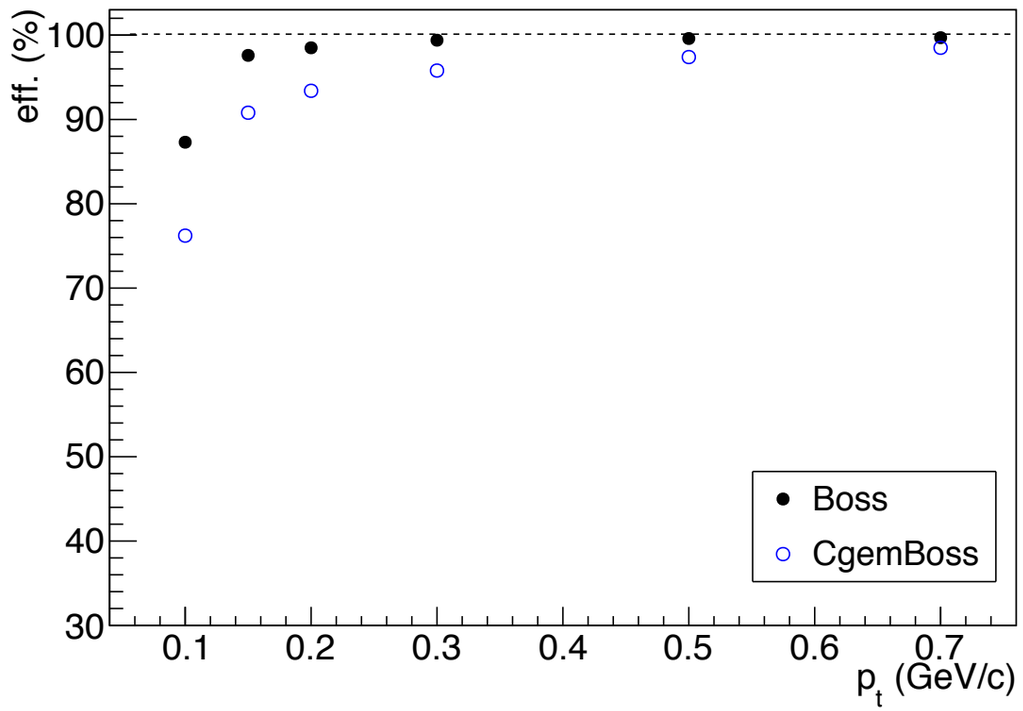
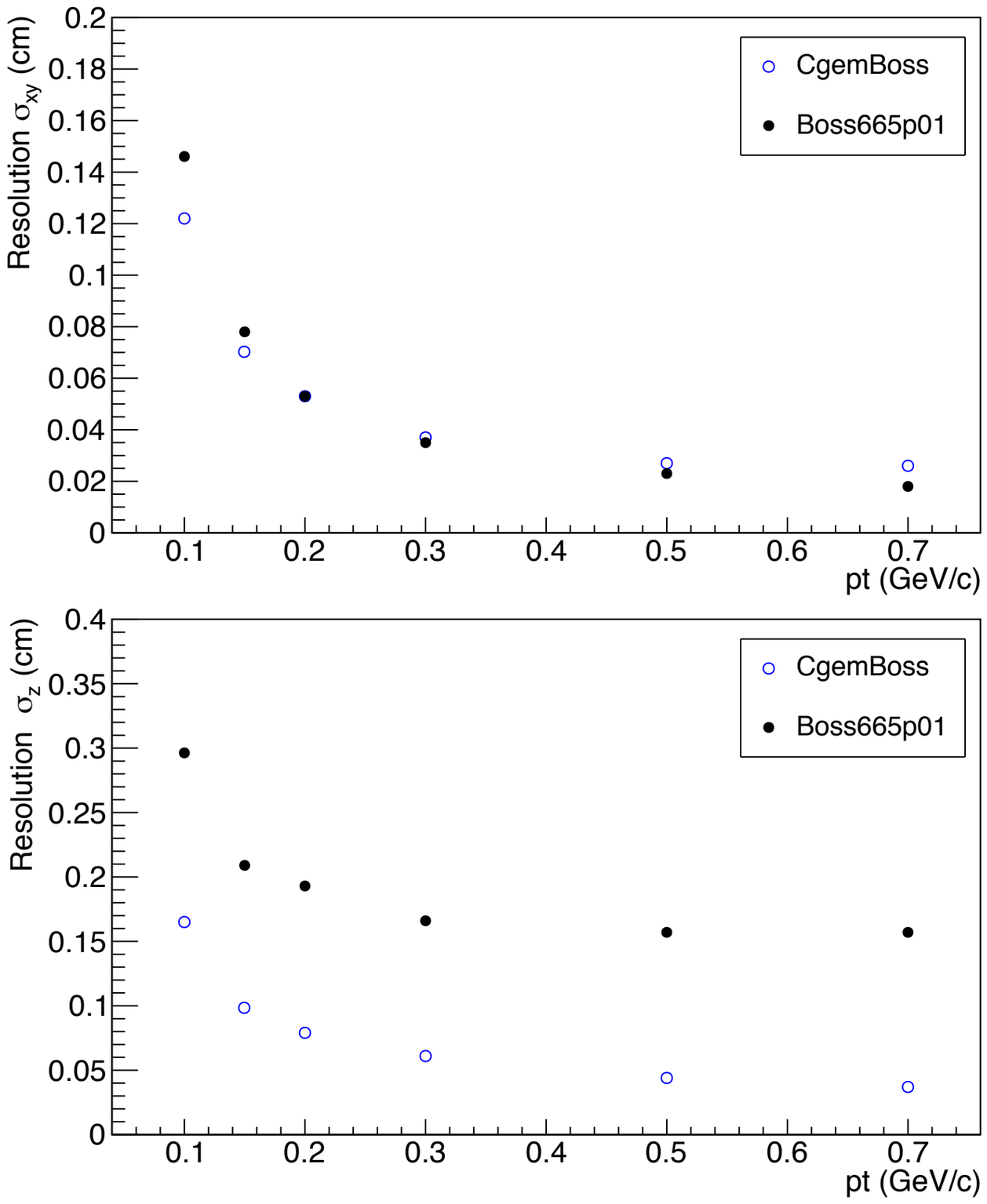
- **Good consistency of the vertex resolution in the XY plane for pt > 300 MeV/c**



Pions: summary



CgemBoss efficiency < Boss efficiency
Vertex resolution along z direction better for CGEM (by a factor of about 3)
Consistency of the vertex resolution in the XY plane for pt > 200 MeV/c