Ref-03 Validation Results

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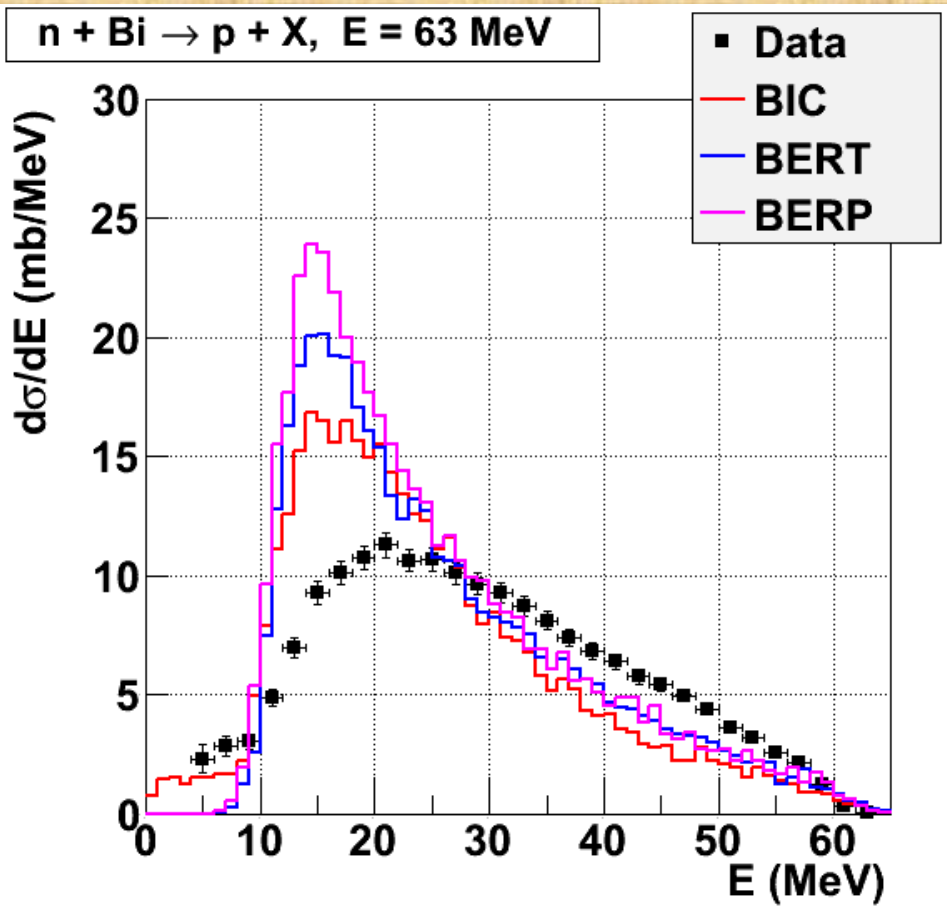
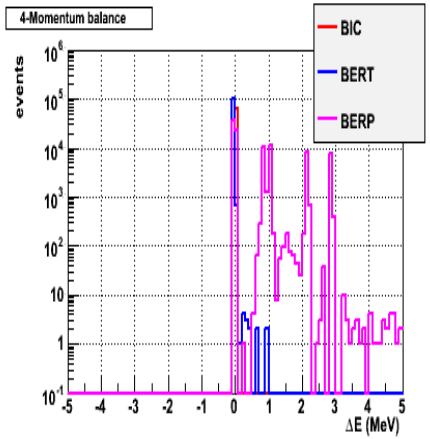
Introduction

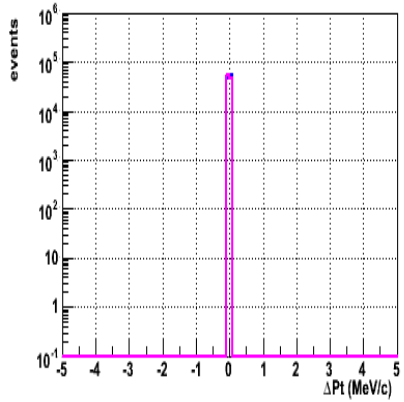
- Due to massive changing in software part we rerun our testing suite
- Results in general are the same as in 9.6
- Run summary:
  - Observed some slow down of Binary and Bertini cascades
  - New fatal exception appears when we run QGSB:
    - p + Be reaction at 8, 12, 15 GeV/c
    - BinaryCascade::GetIonMass – invalide (A,Z)=(0,2)

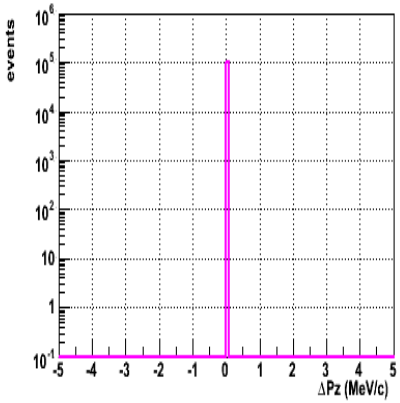
test30

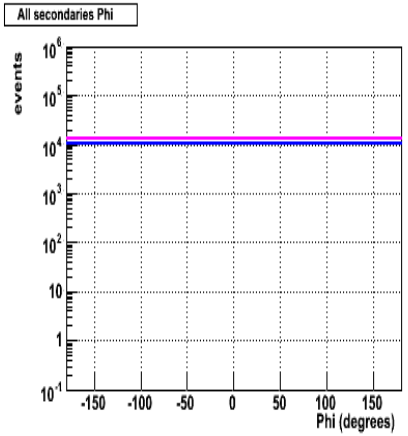
Proton production at low energy – stable result energy conservation problem not fixed in BERP



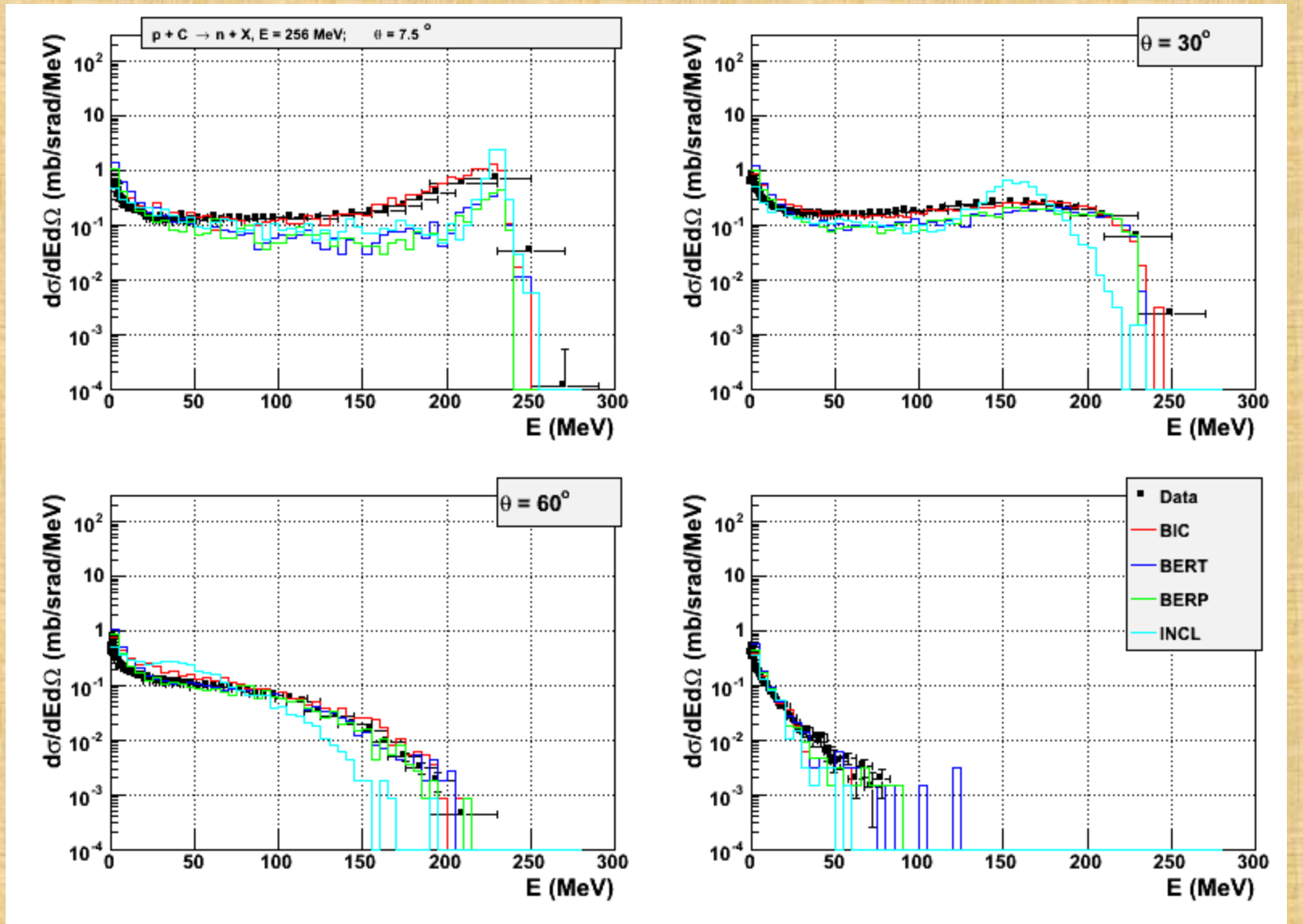




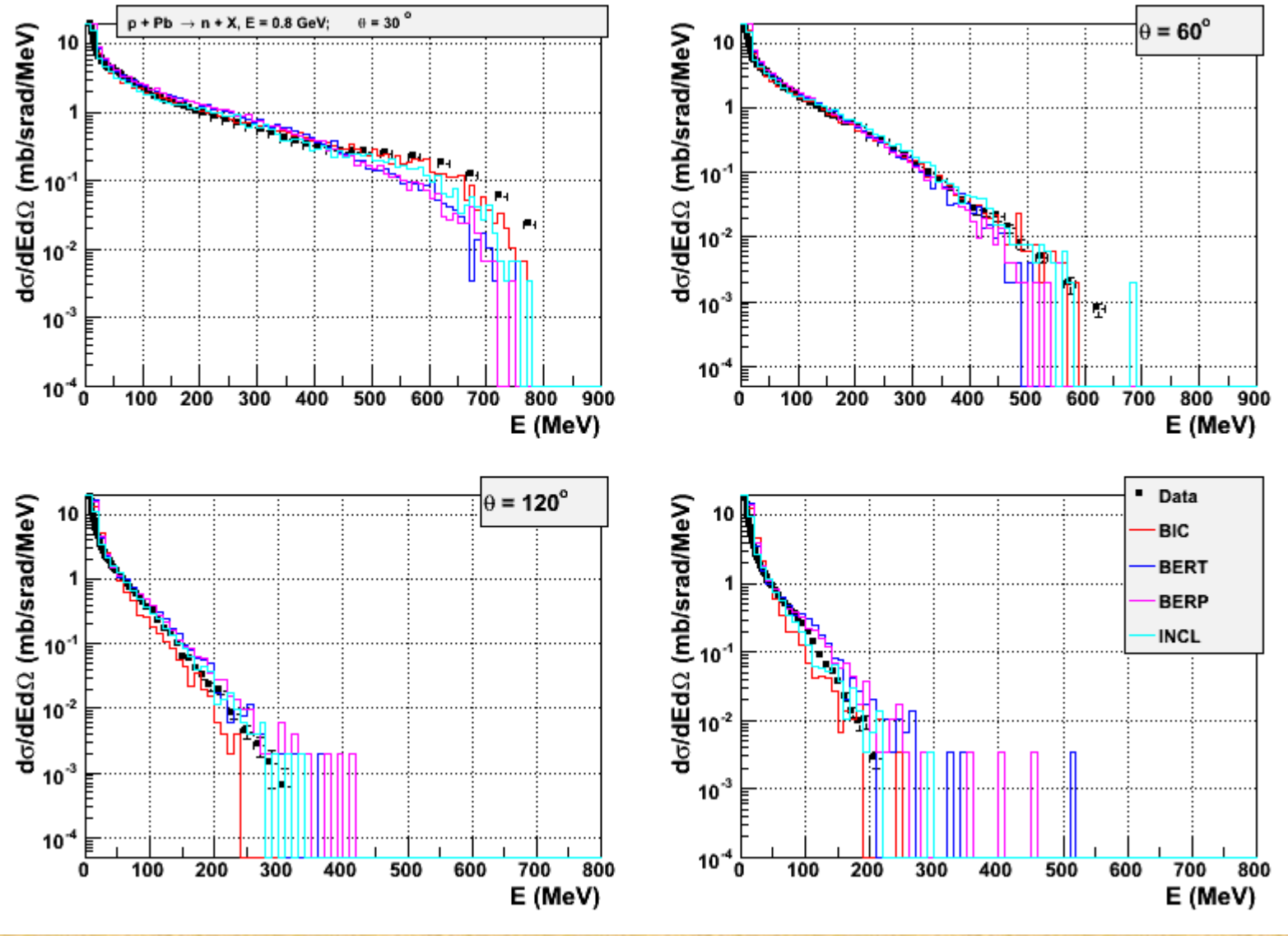




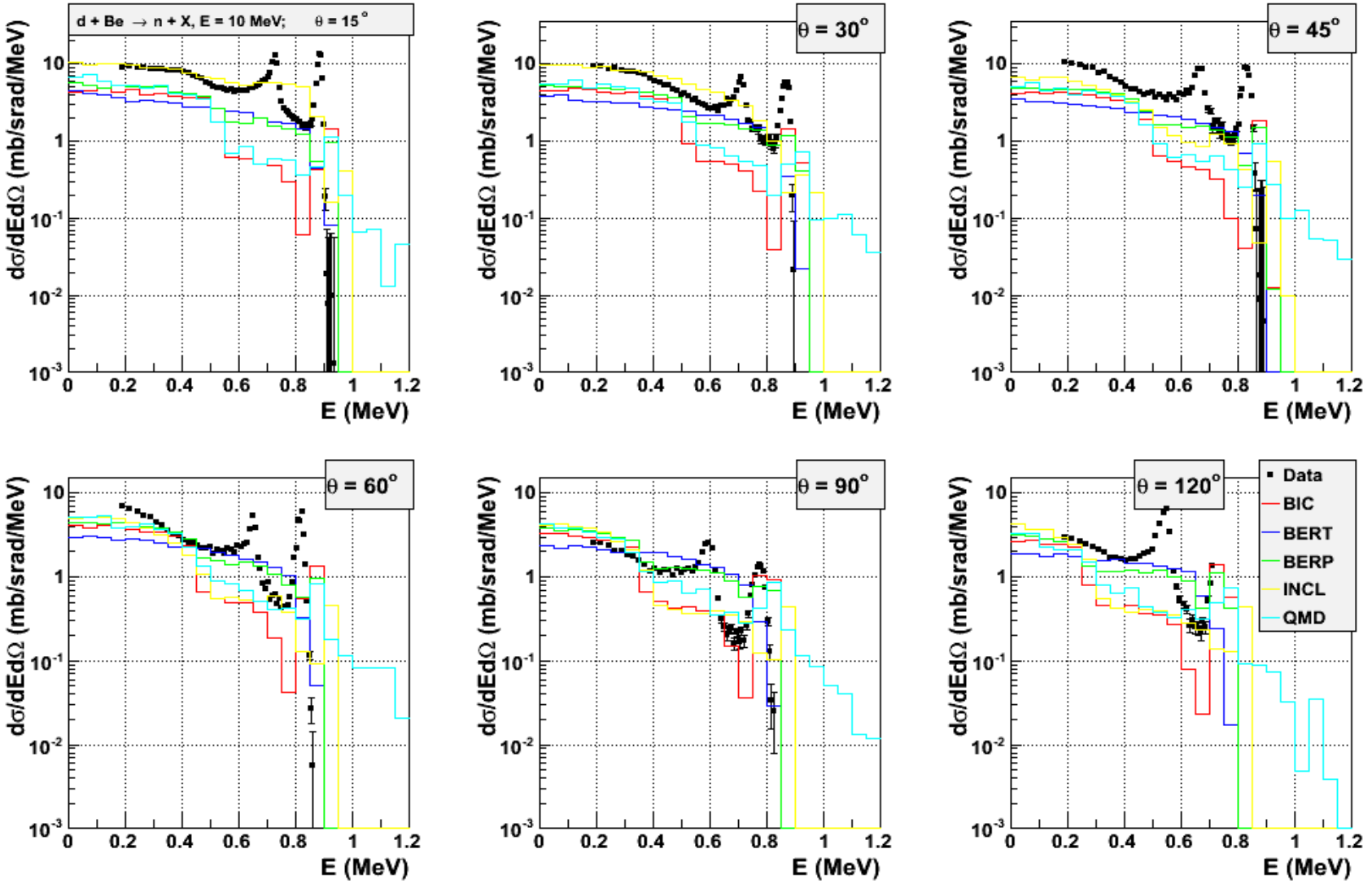
Neutron production - stable



Neutron production - stable



Low-energy nuclear physics not well simulated by our cascades (Michel's request)



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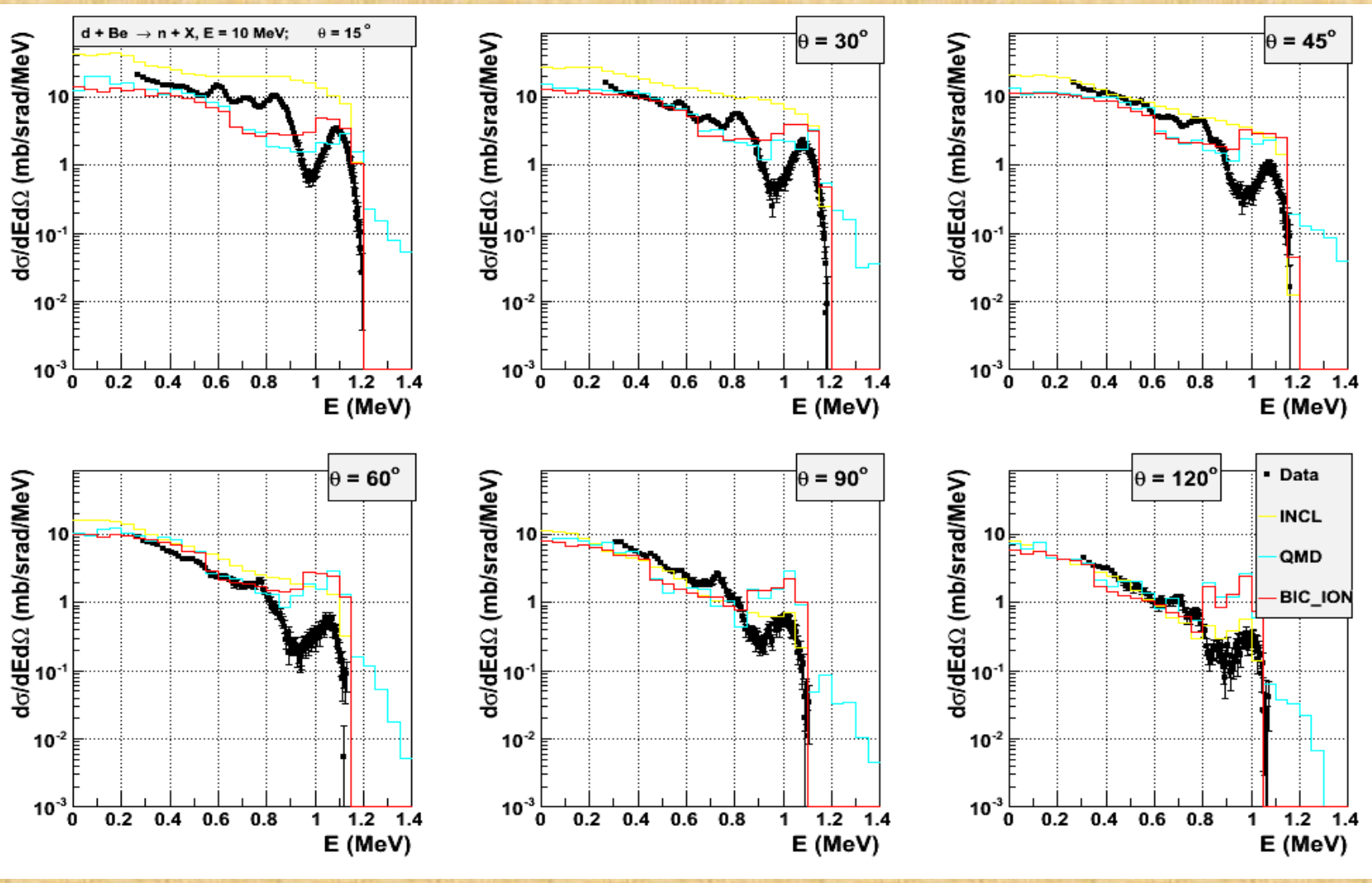
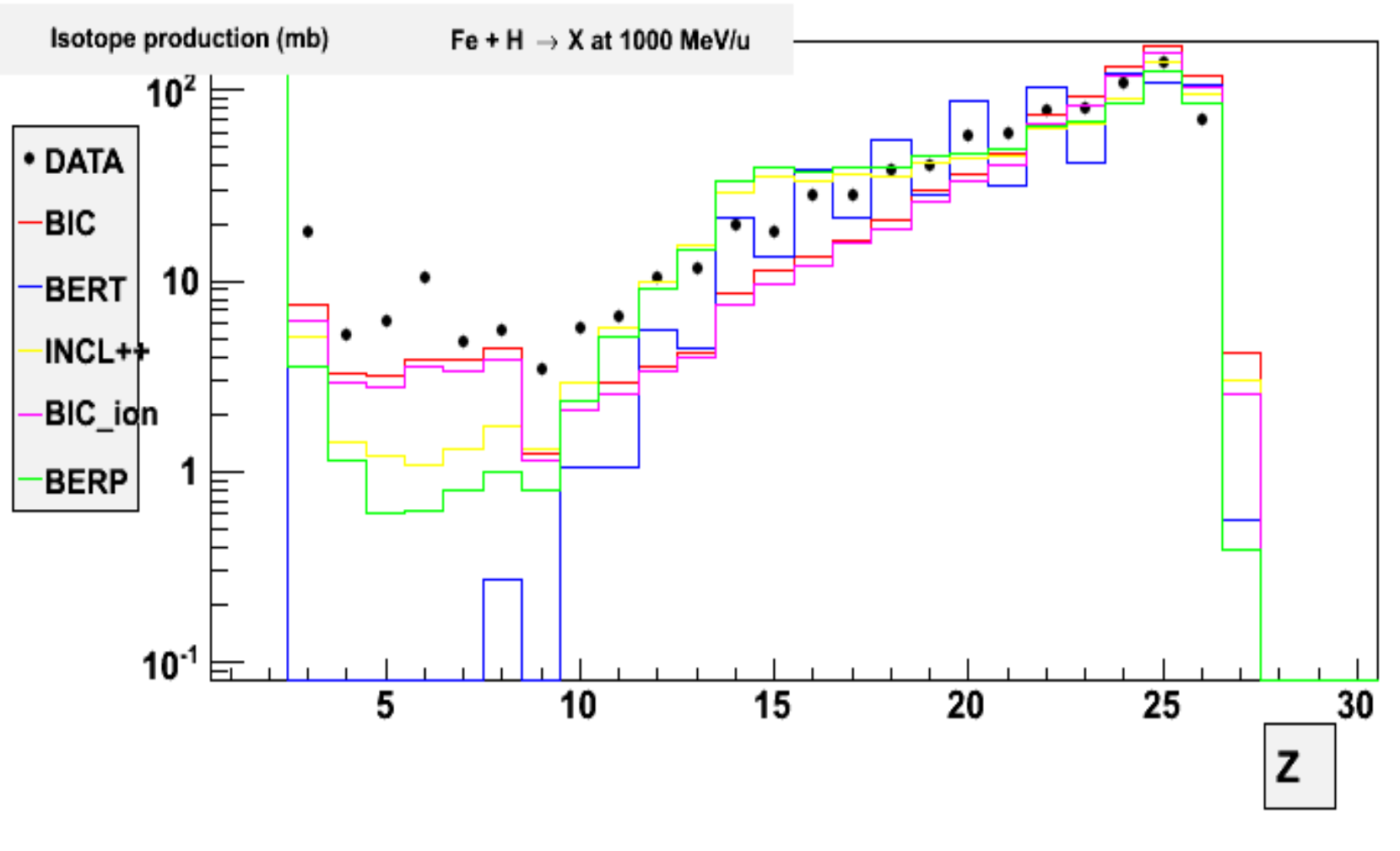


Summary on test30

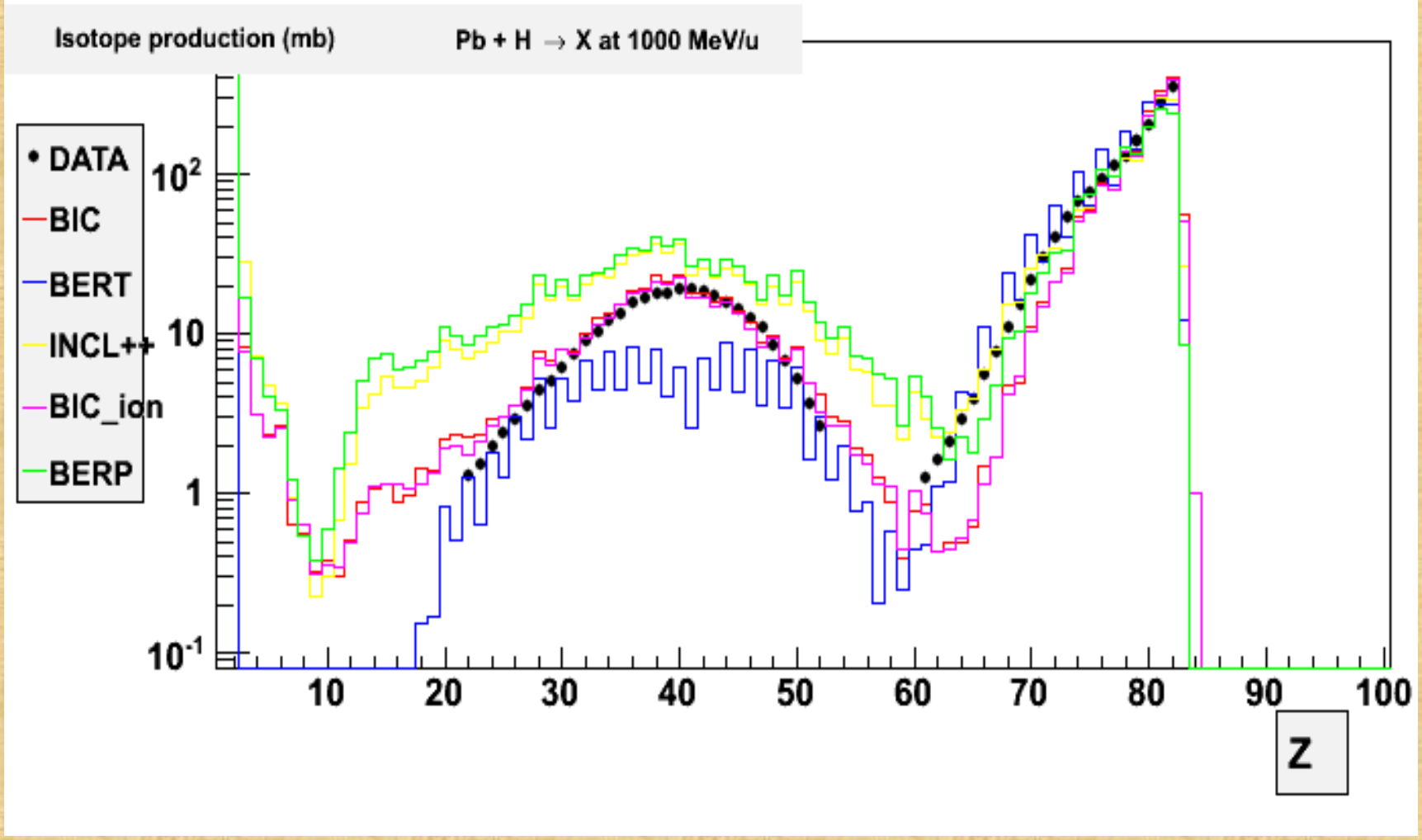
- Results are stable in general for few recent releases
- After migration integer Z and A there is exact 4-momentum balance in the Binary Cascade
- Still Bertini interface to pre-compond introduces energy disbalance
- Low-energy neutron physics is not well simulated (related to Michel questions):
  - Are our cross sections adequate?
  - Are Fermi BreakUp work properly?

IAEA benchmark

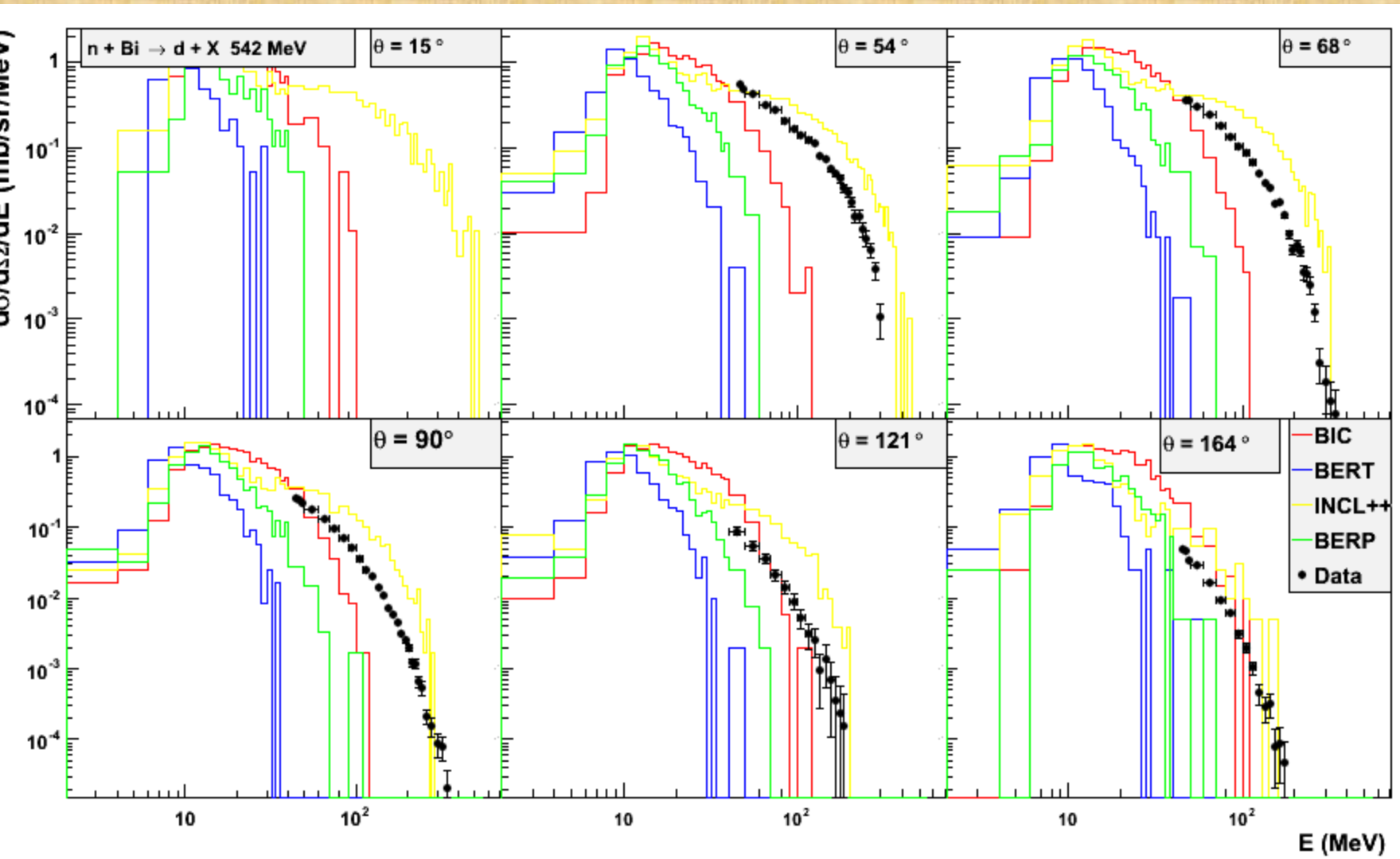
Isotope production: INCL++ and BERP are better for high Z, Binary – for low Z



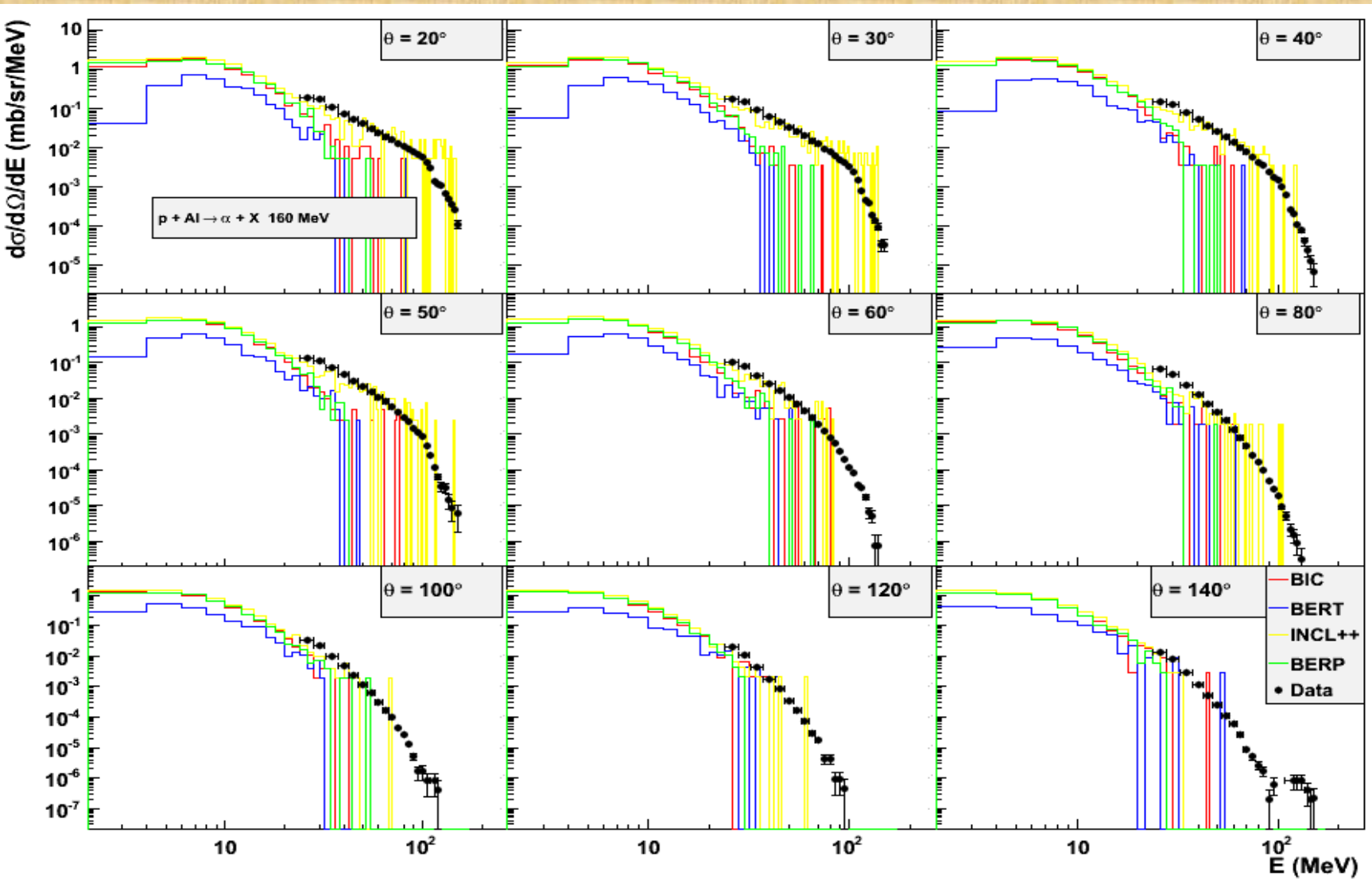
Isotope production: INCL++ and BERP are better for spalation, Binary – for fission



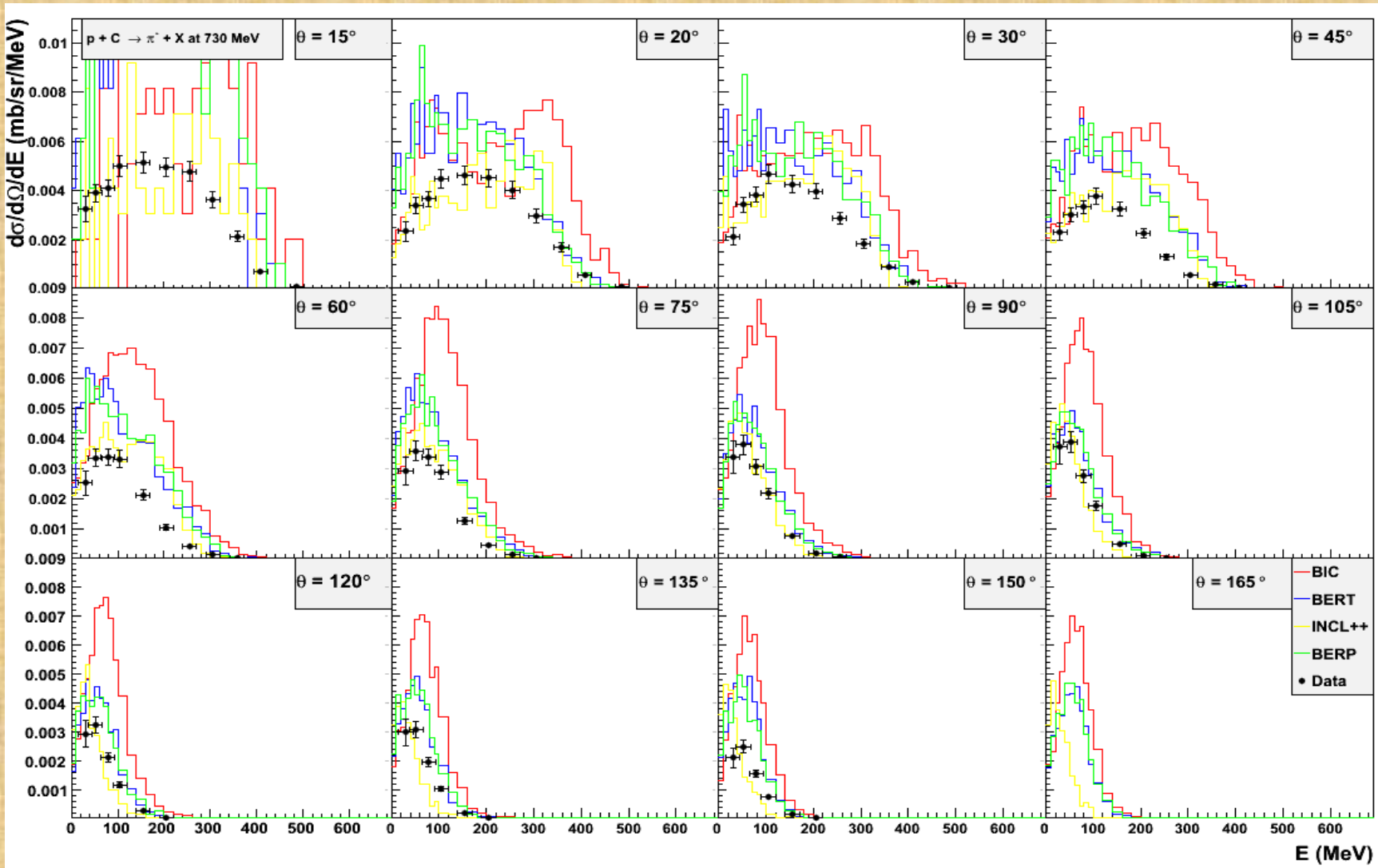
INCL++ better reproduce deuteron production



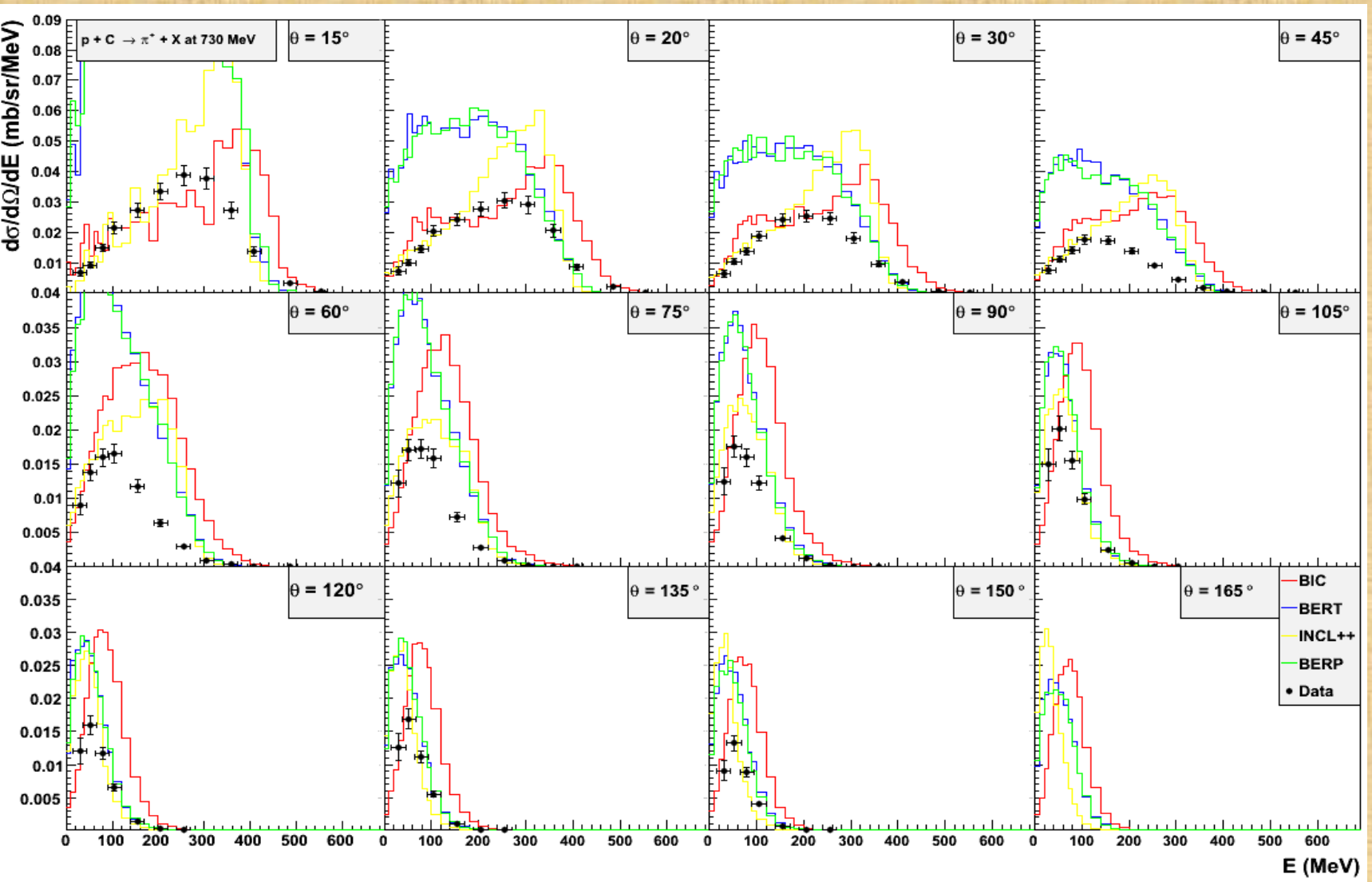
INCL++ better reproduce alpha production



All cascades overestimate pi-



All cascades overestimate pi+



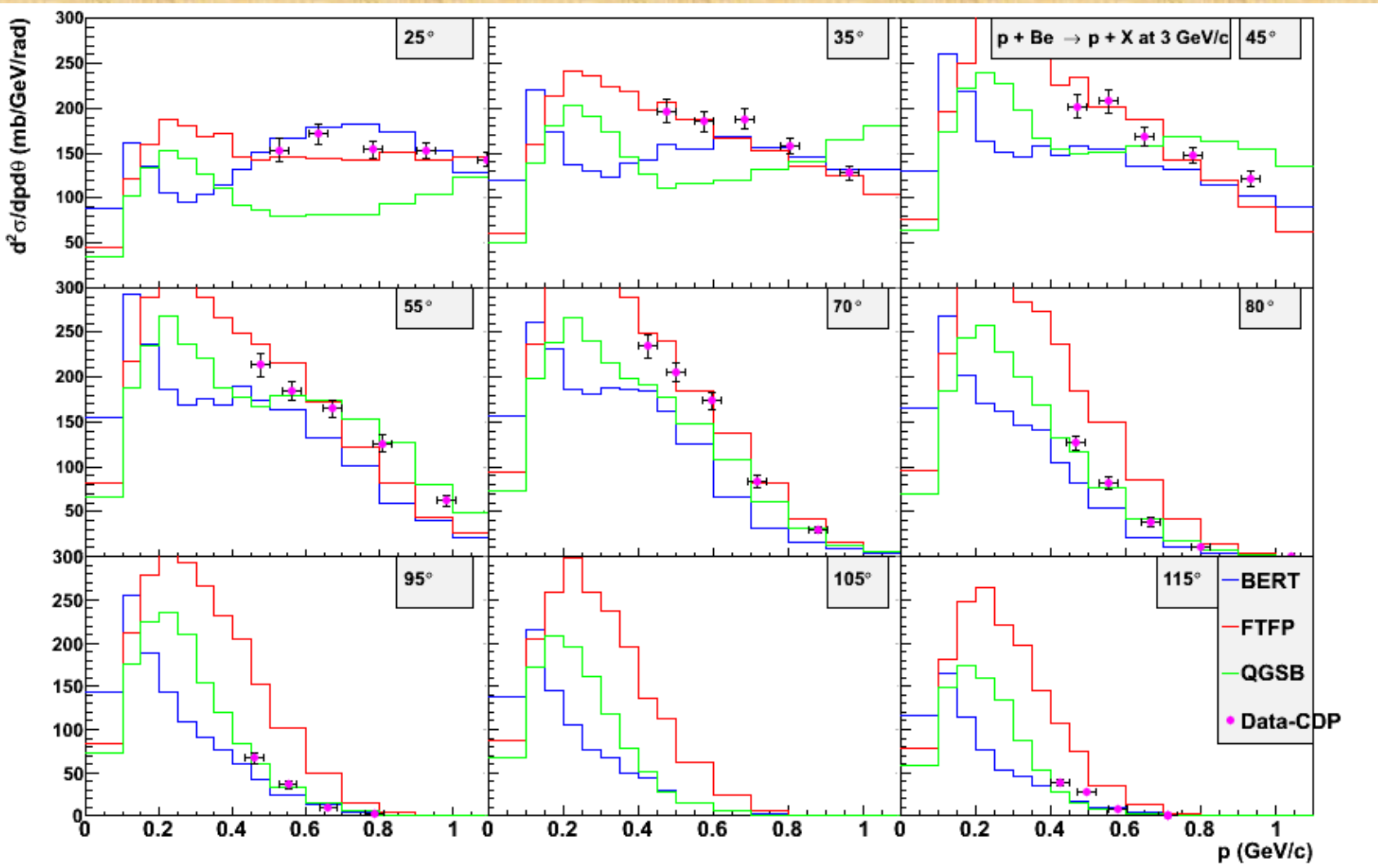
Summary on IAEA

- Stable results
- Coalecence is implemented only in INCL++
- Pion absorption is not implemented in the Binary, was reduced in some moement in past for Bertini

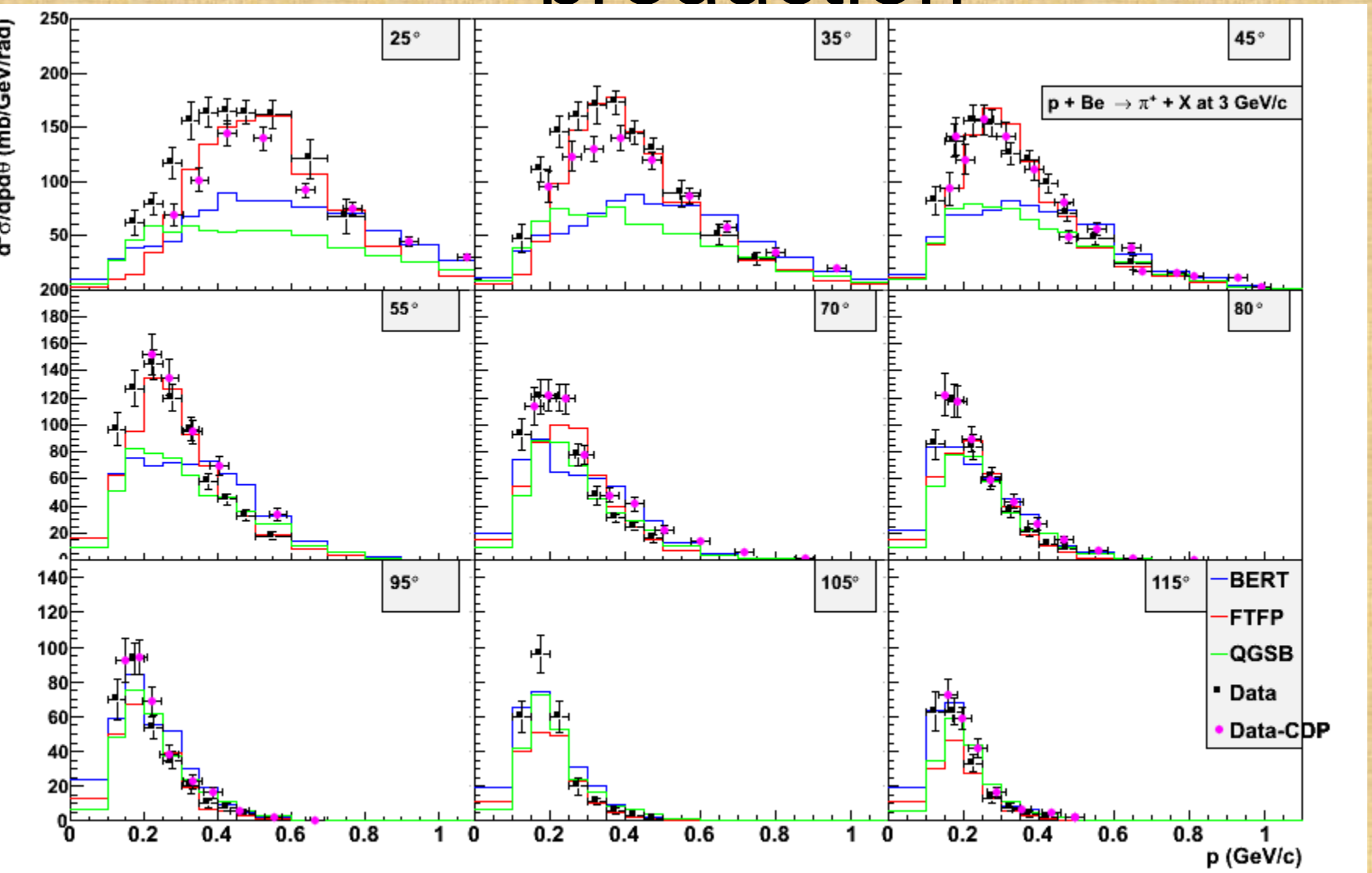
Test35

Only Be, Ta large angles 3 and 12 GeV/c pi+ and proton production will be shown

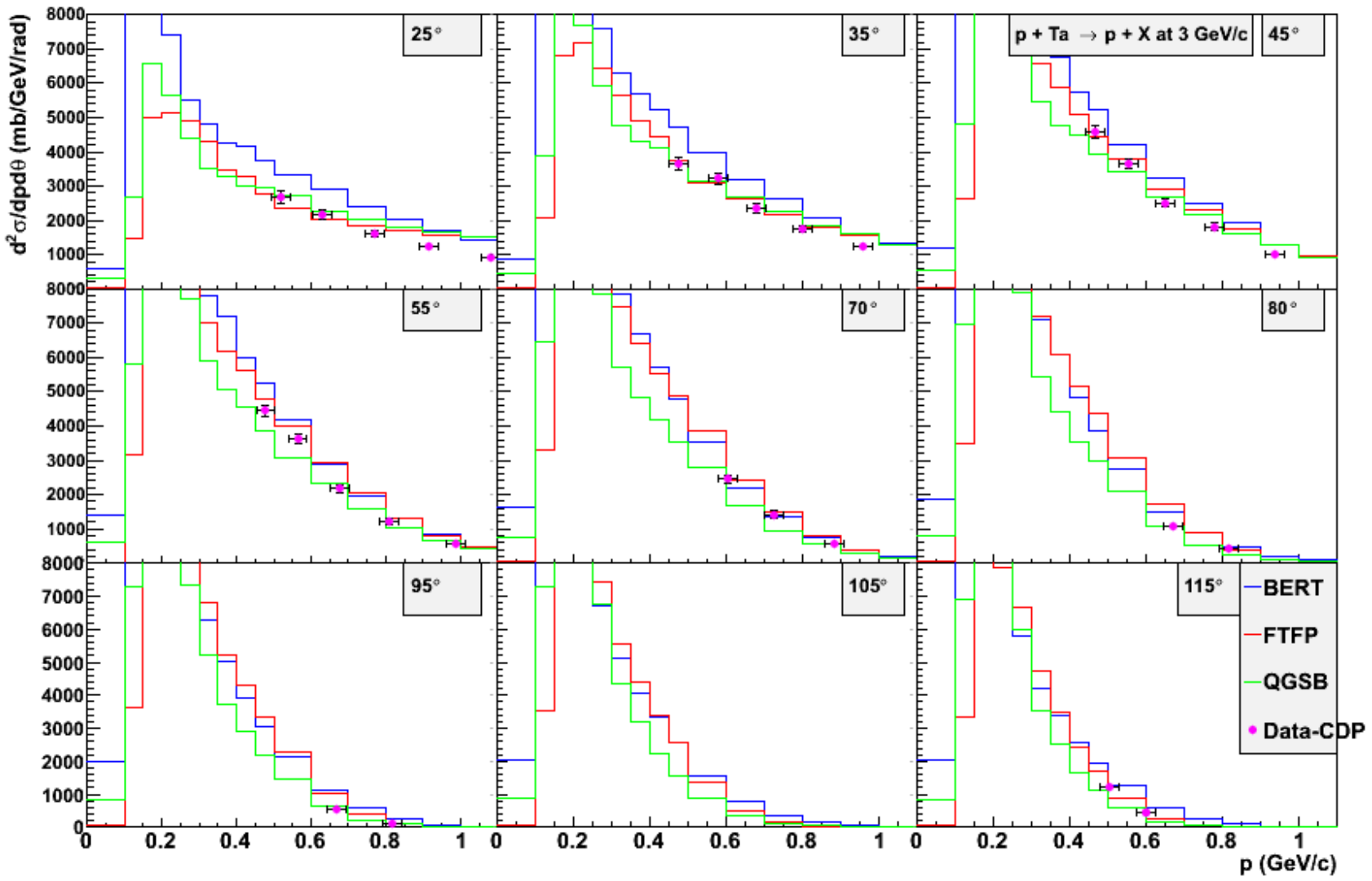
FTFP follow the data on proton production



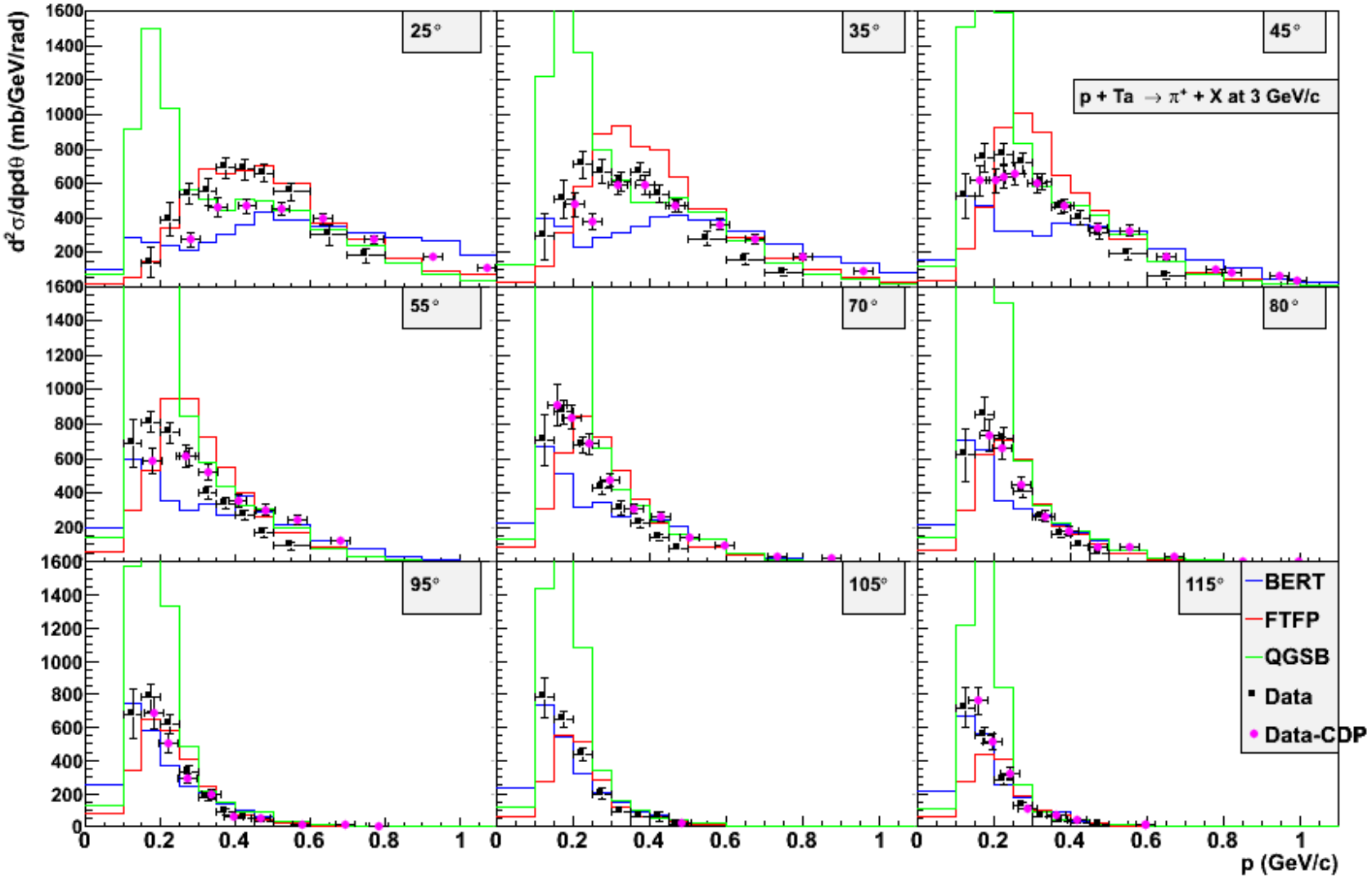
FTFP follow the data for pion production



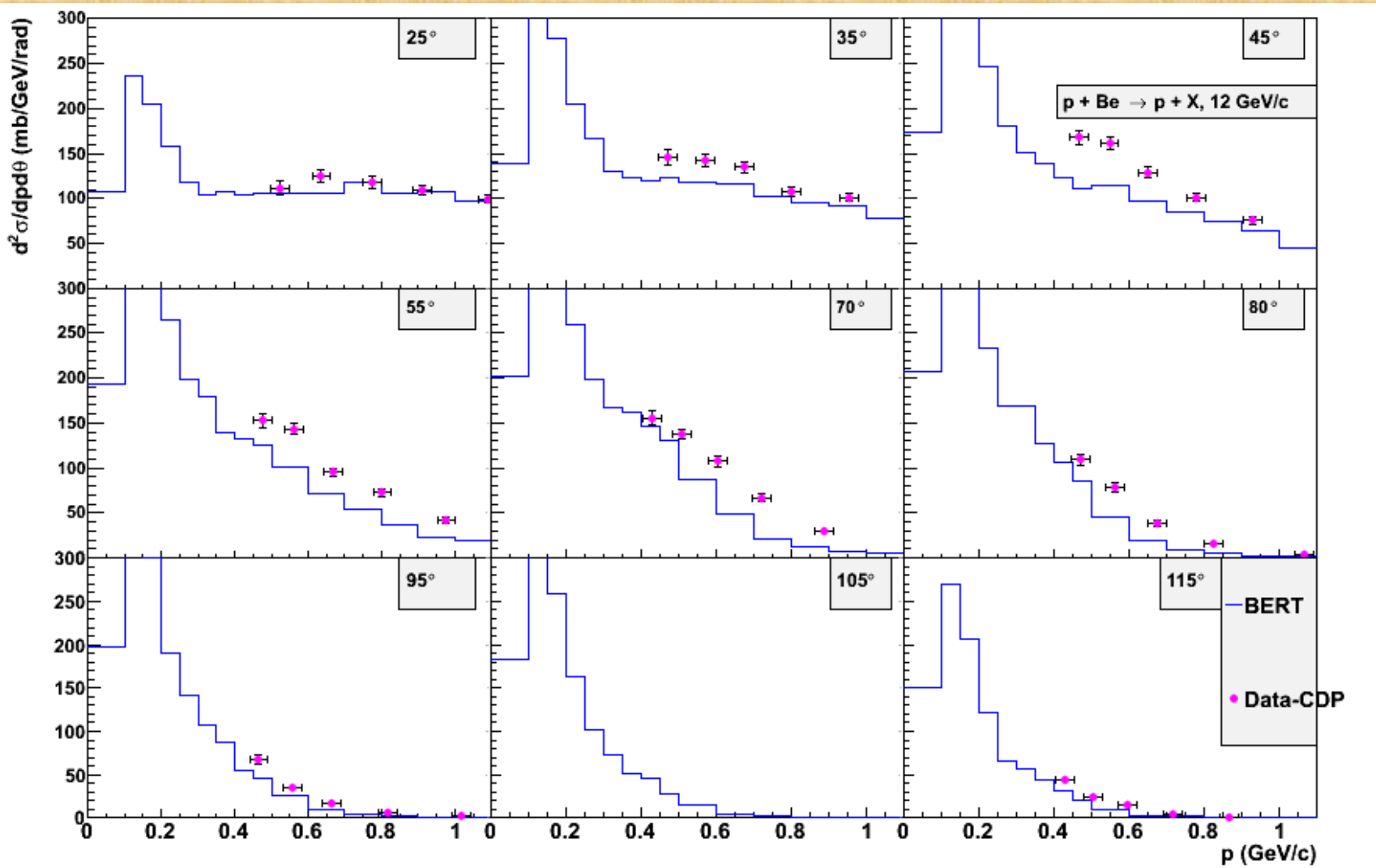
All models are fine for proton production



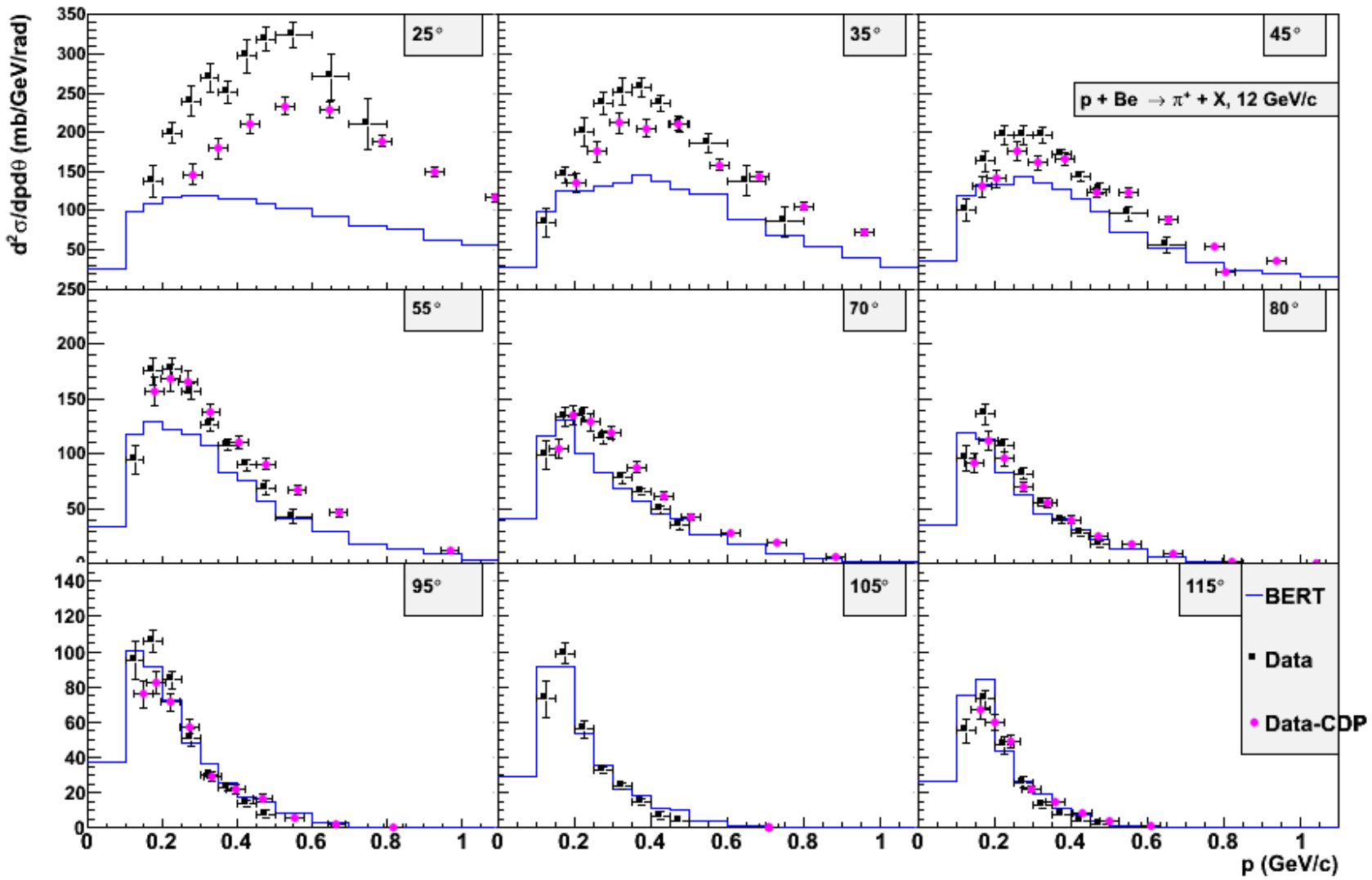
FTFP is better for pion production



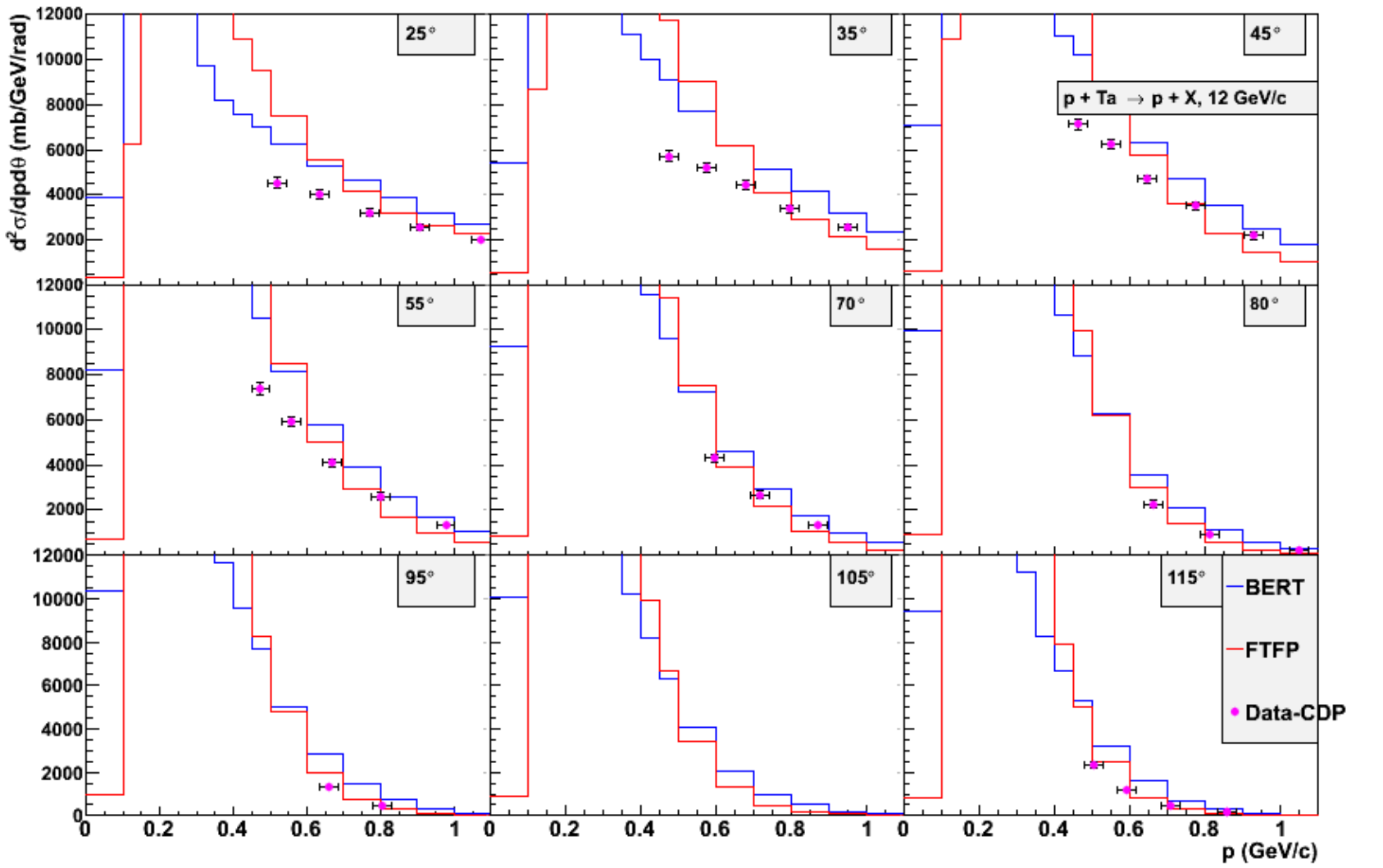
Bertini is OK, QGSB has crash (was not in 9.6)



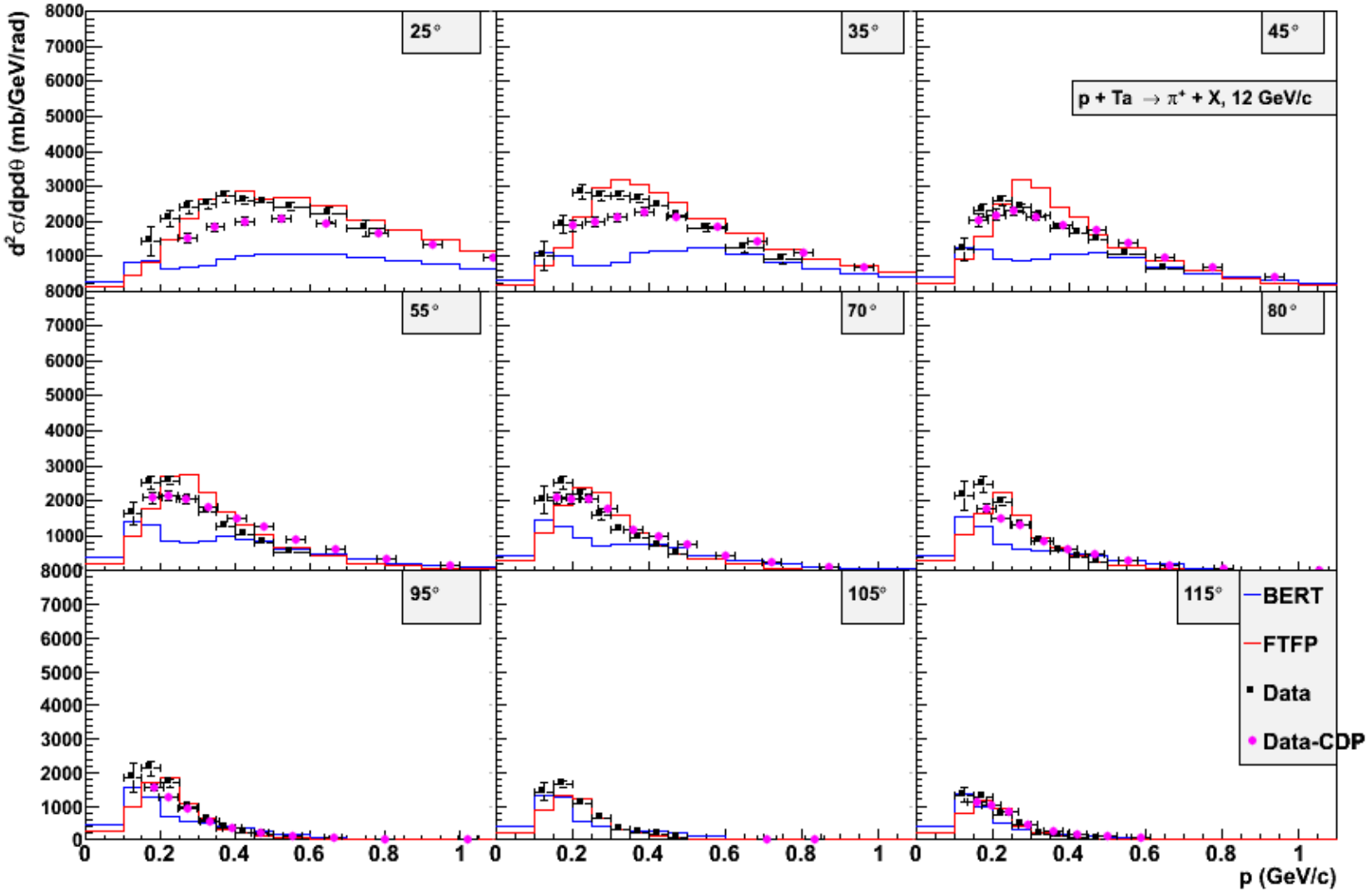
Bertini underestimate forfard pions, QGSB has crash (was not in 9.6)



Not ideal agreement for both FTFP and Bertini



FTFP better describes pion production



Summary for test35

- Proton production is described reasonably by both Bertini and FTFP
- Pion production is underestimated by Bertini, espetially in forward direction
- QGSB is bad
  - off for proton production
  - No pion absorption – low-energy peak
  - Crash at high energy in Be