Water Cherenkov Detector
Geant4 Simulation

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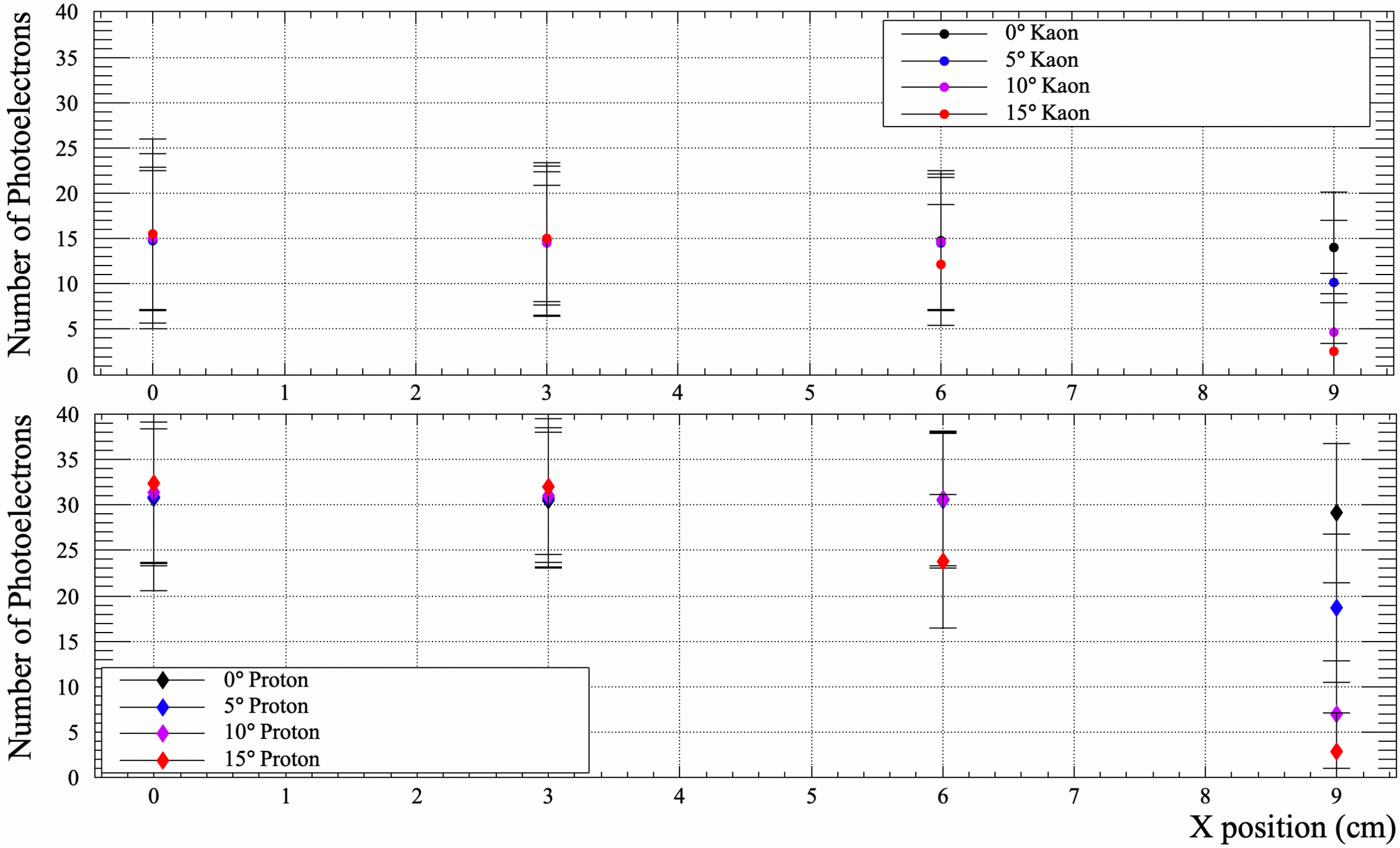
Contents

- Npe yield of WC single module when Kaon and Proton is incident
  - Momentum Range : 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300 MeV/c
  - Position : x-axis (~ 9 cm in 3 cm), y-axis (~ 80 cm in 10 cm)
  - Angle : 0 ~ 15 deg in 5 deg.
- Npe yield of WC at the 2nd layer when the particle is passed through ‘dead area’
  - Momentum : 1.3 GeV/c Proton and Kaon each
- ELPH experiment Geant4 Simulation

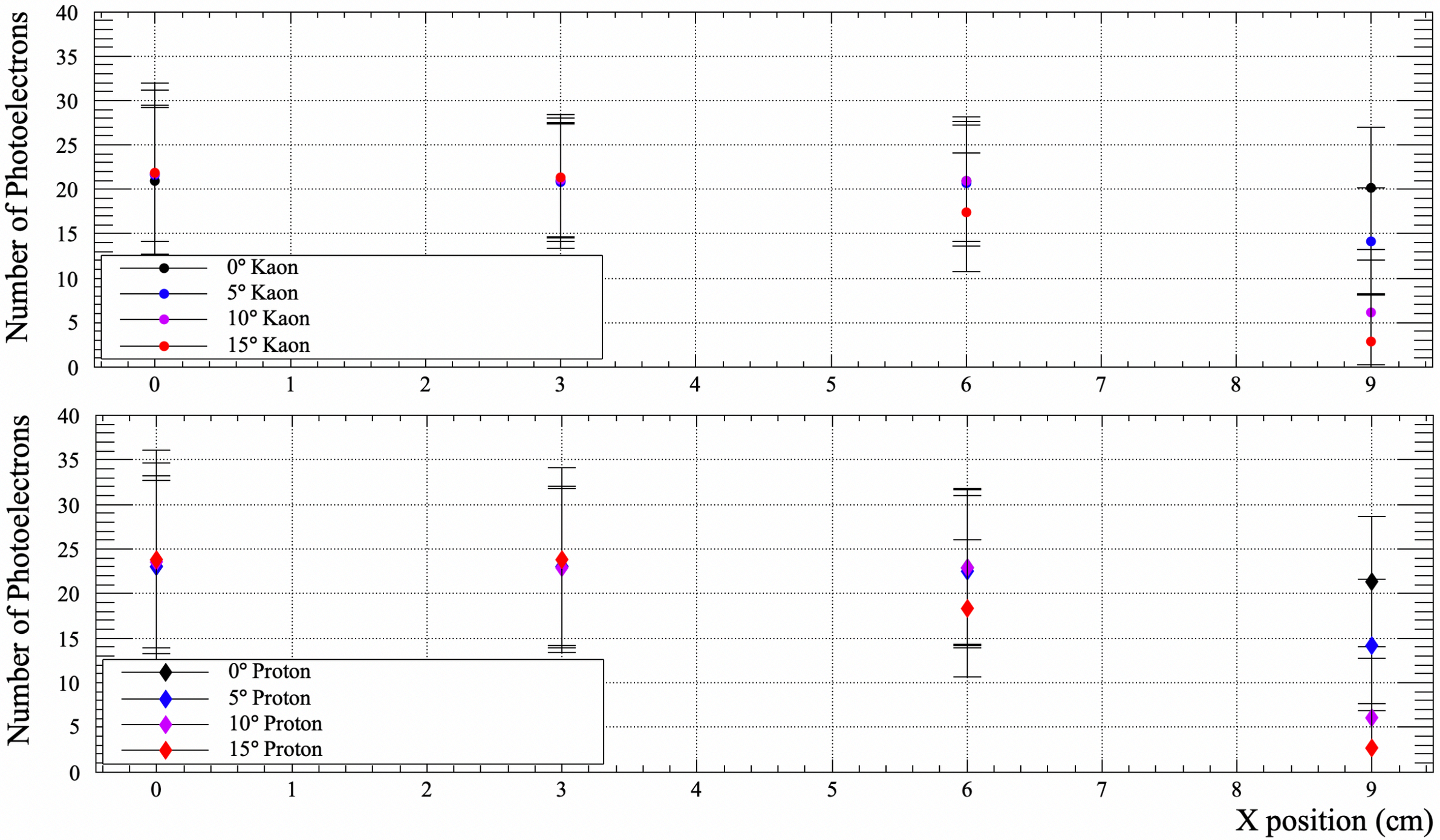
K+/p Npe yield - x axis

- Incident particle momentum : 600 MeV/c



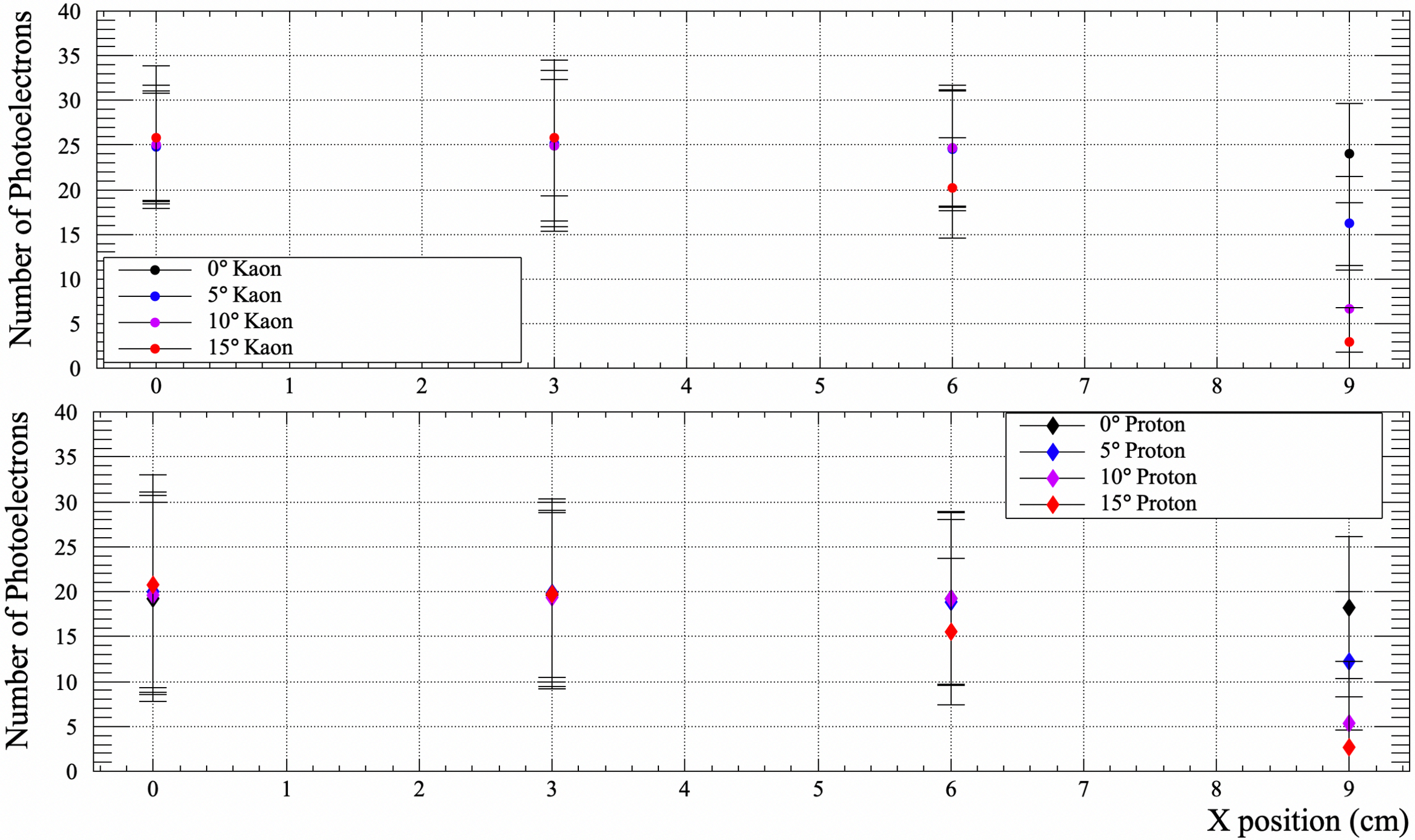
K+/p Npe yield - x axis

- Incident particle momentum : 700 MeV/c



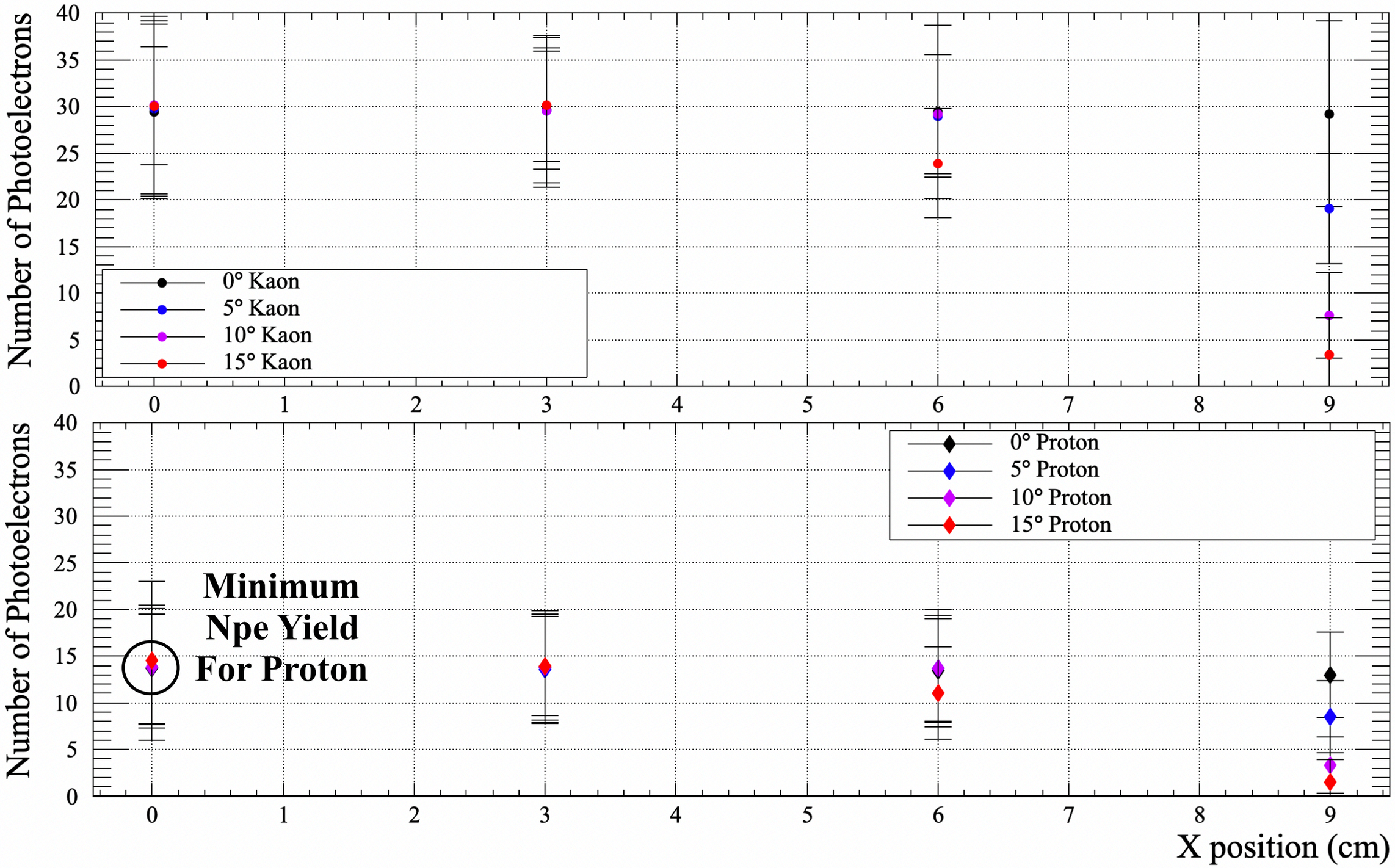
K+/p Npe yield - x axis

- Incident particle momentum : 800 MeV/c



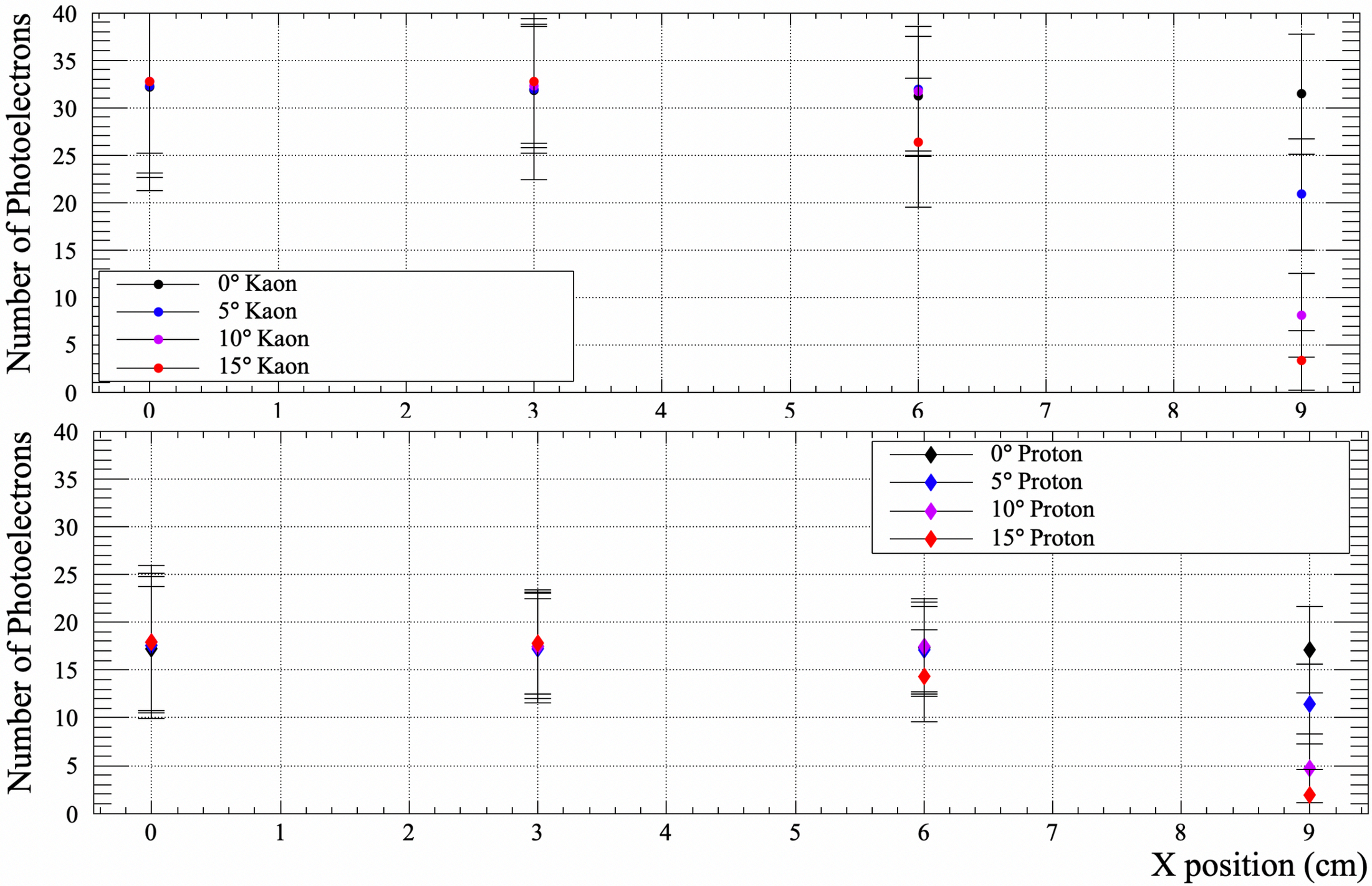
K+/p Npe yield - x axis

- Incident particle momentum : 1.0 GeV/c



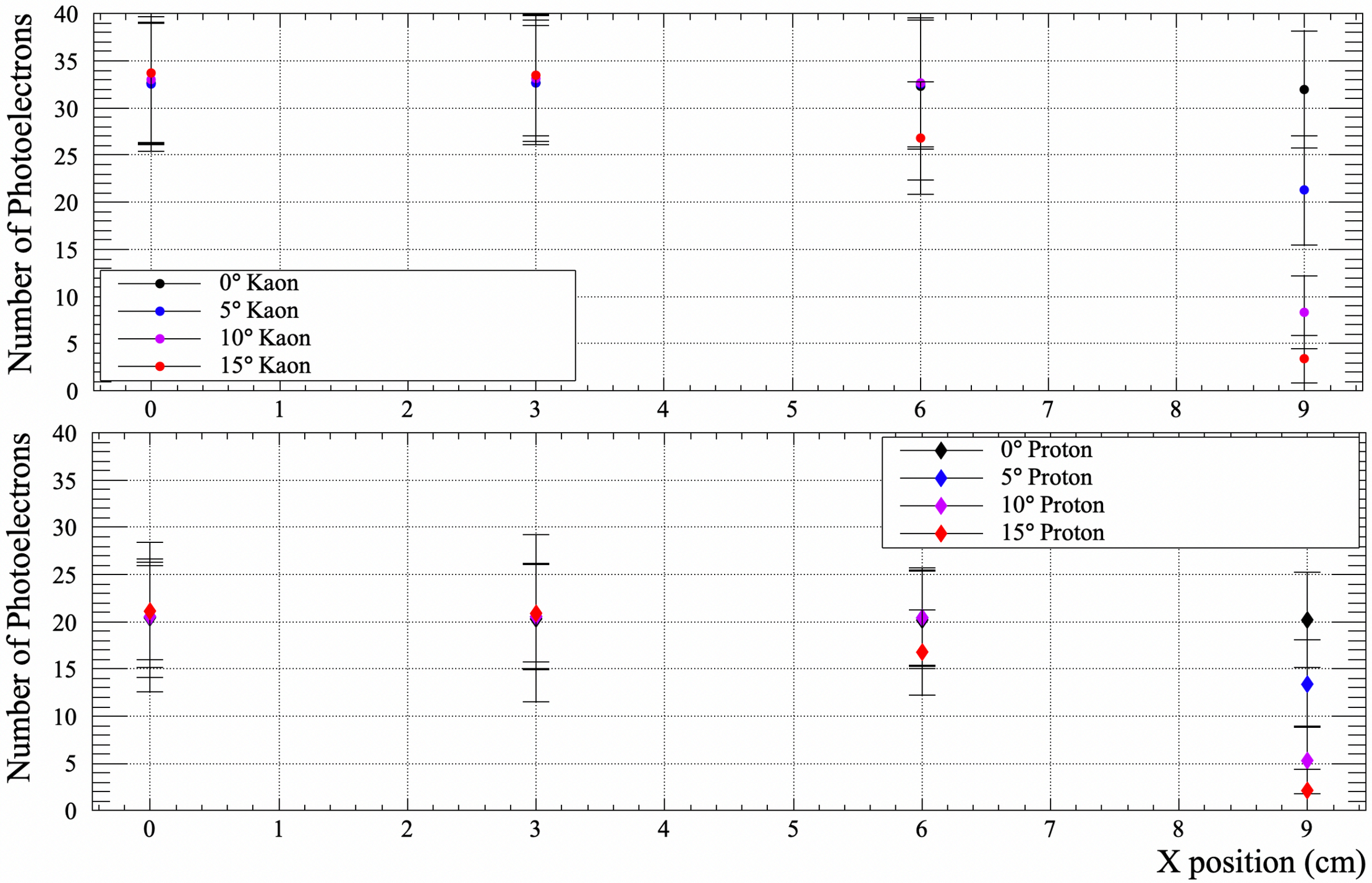
K+/p Npe yield - x axis

- Incident particle momentum : 1.2 GeV/c



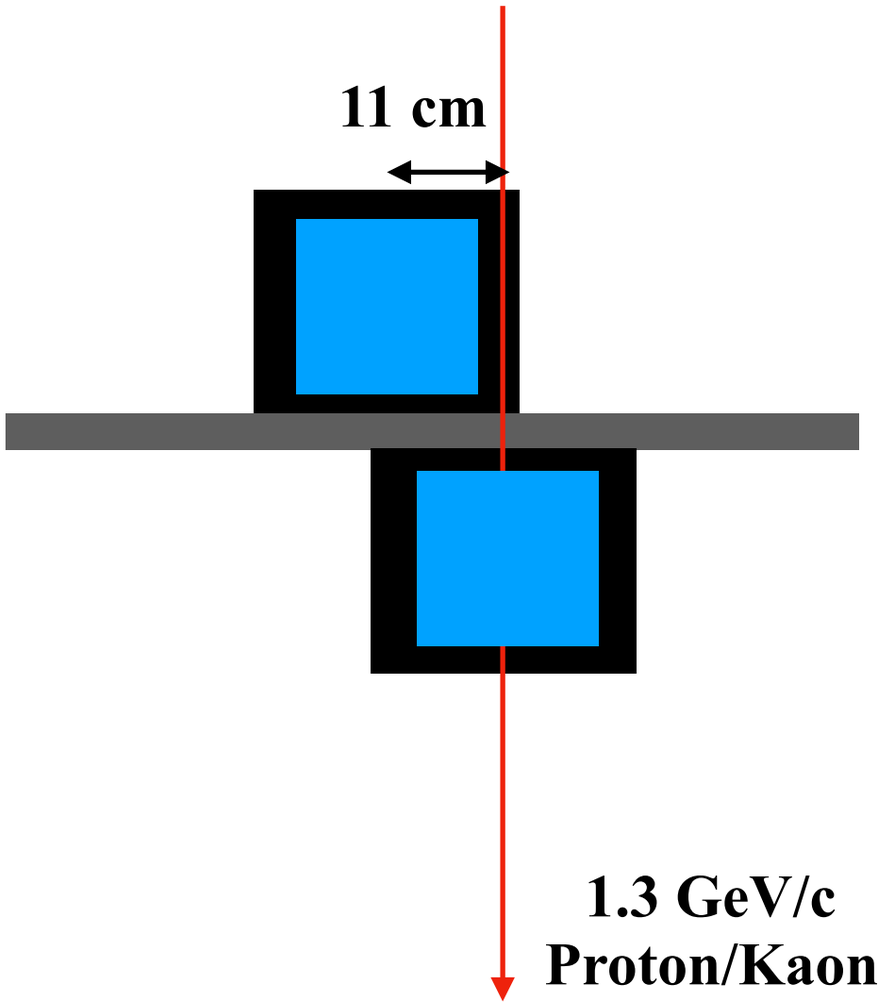
K+/p Npe yield - x axis

- Incident particle momentum : 1.3 GeV/c



Npe yield of WC at 2nd layer

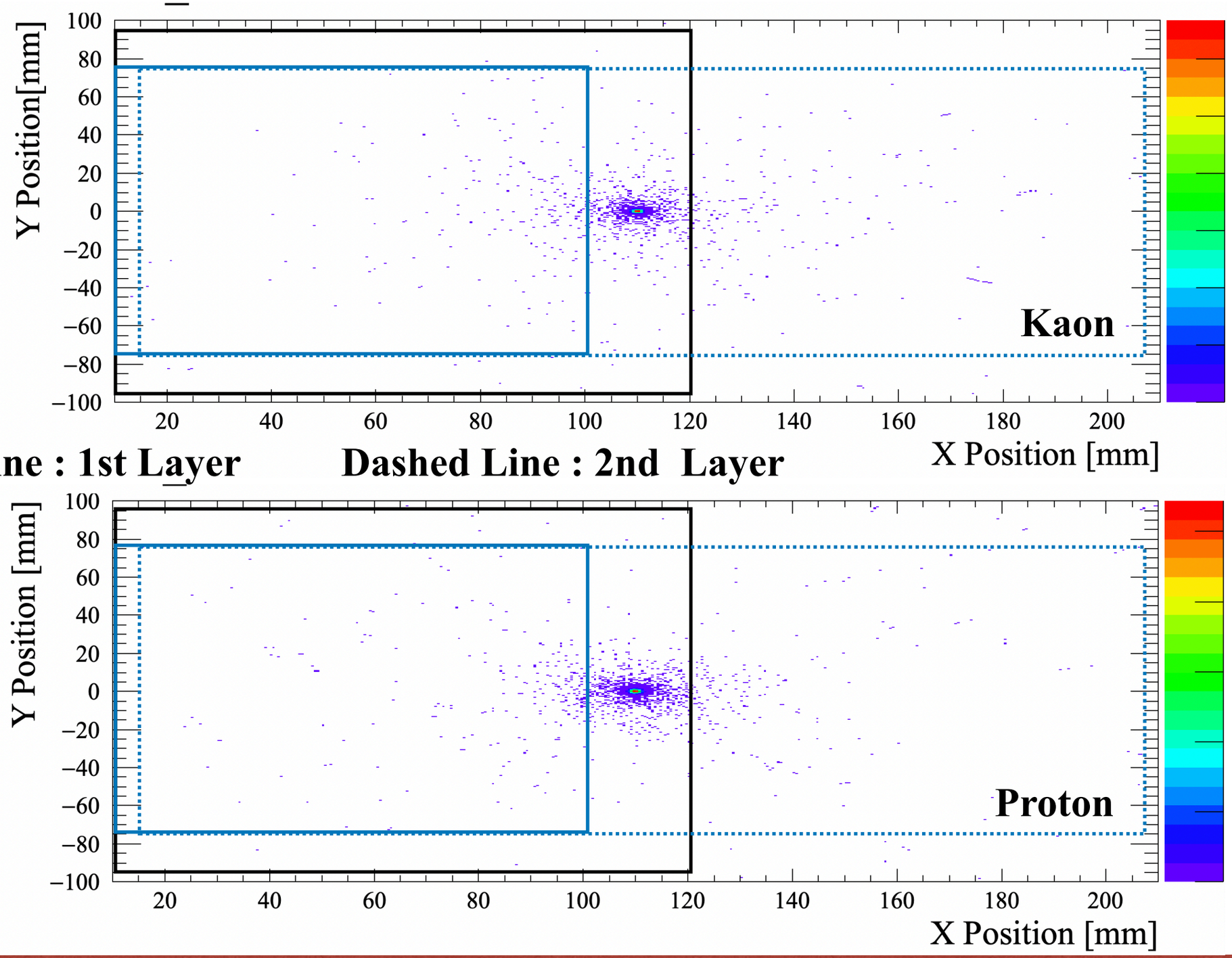
- Configuration



- Physics List
  - Transportation
  - Optical Process
  - EM Process
  - Hadronic Process (FTFP_BERT)
  - Decay

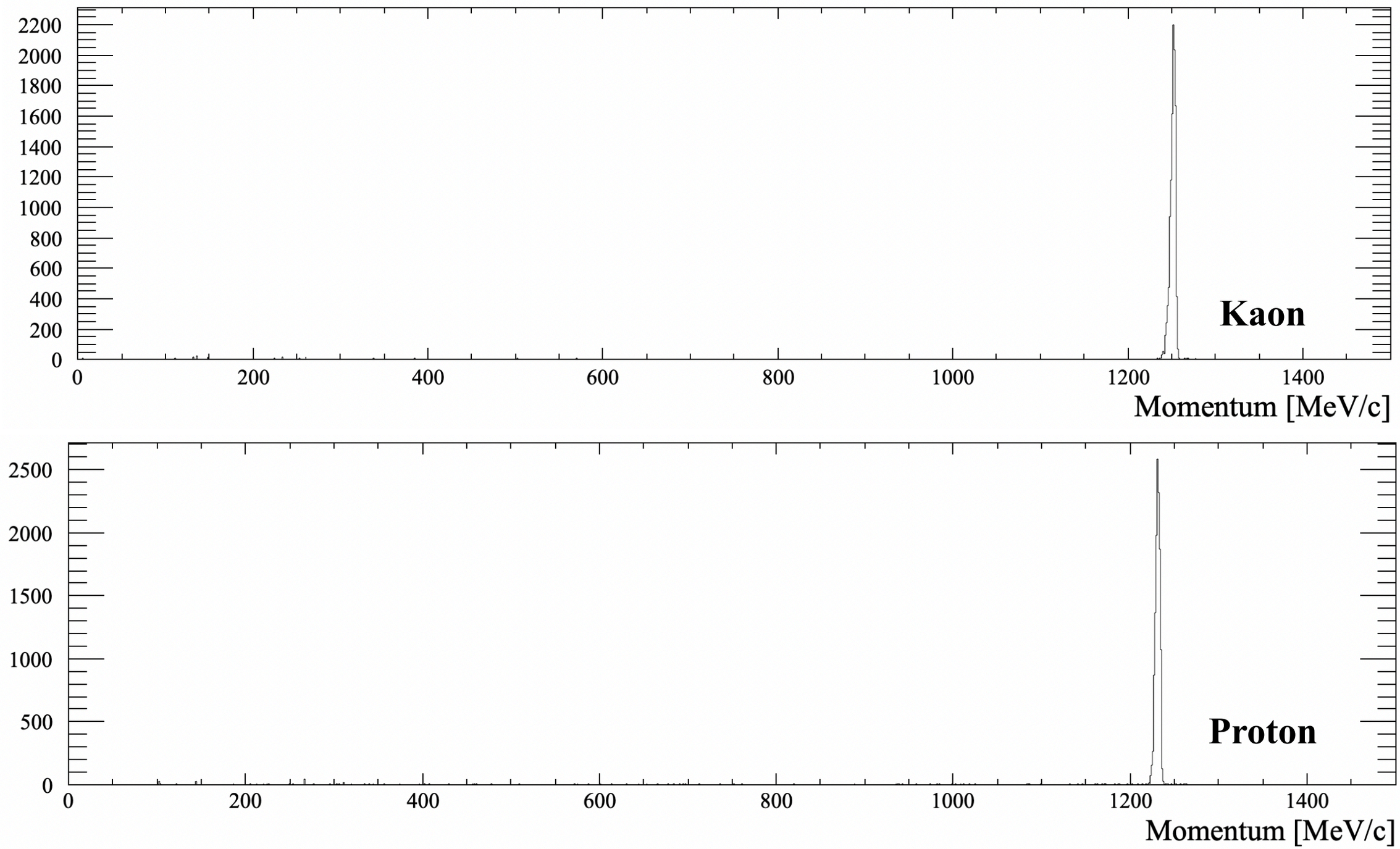
Npe yield of WC at 2nd layer

- Hit position of dummy plane



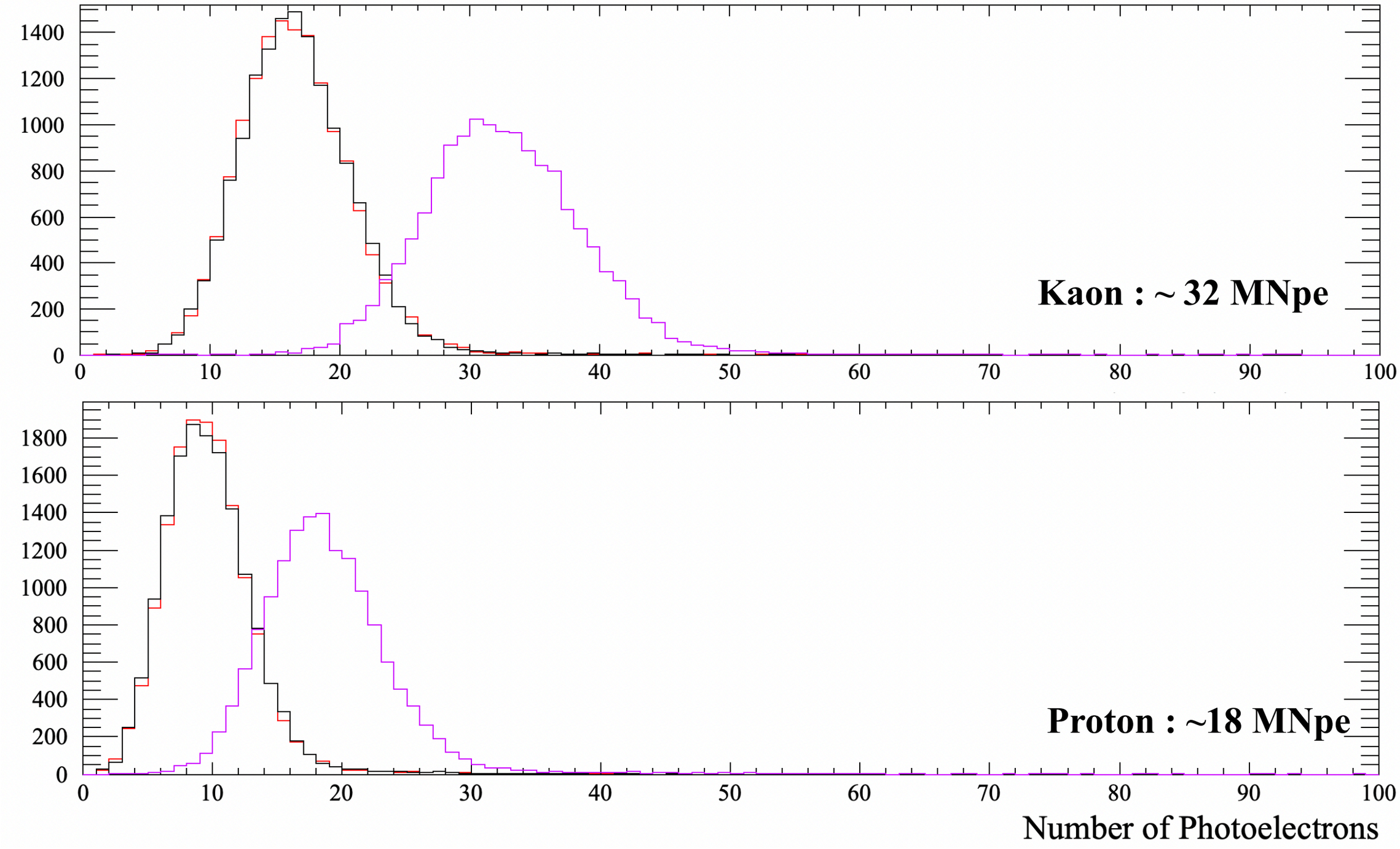
Npe yield of WC at 2nd layer

- Momentum Distribution



Npe yield of WC at 2nd layer

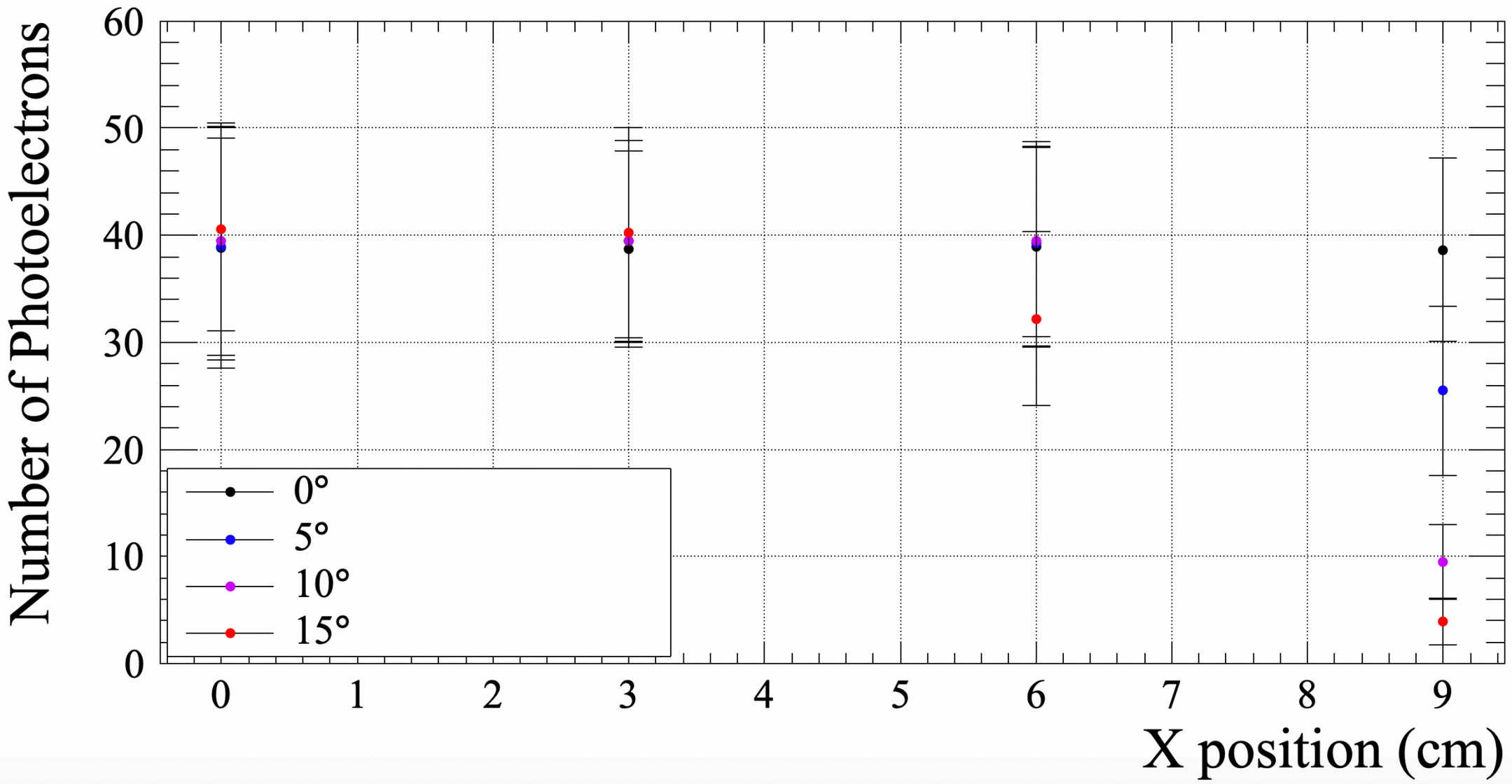
- Npe Distribution of WC at 2nd layer



Geant4 Simulation

- Position and angle dependency was not shown along x except 15 deg

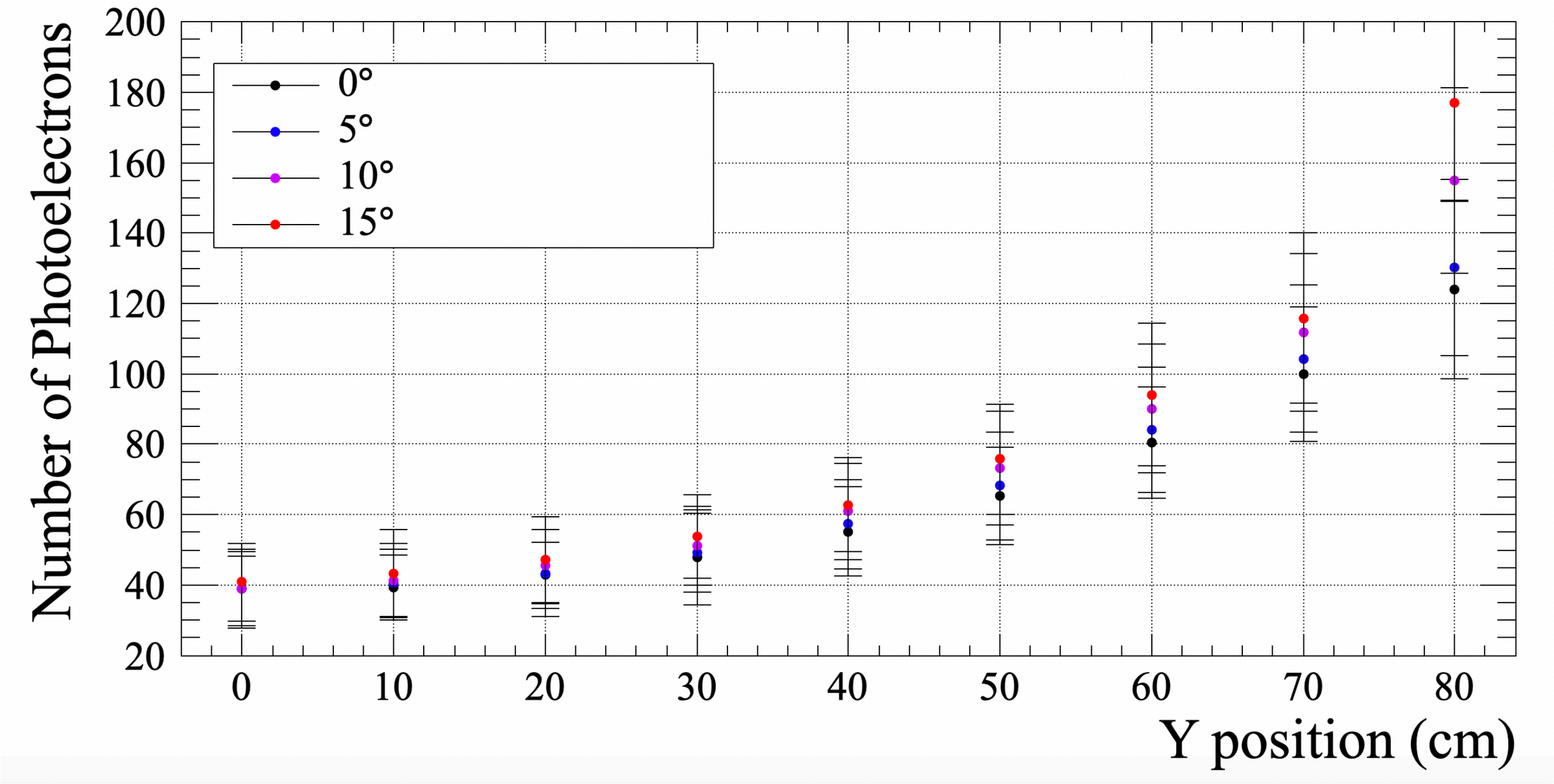
- In case of incident in x = 9 cm, Npe decreases drastically



Geant4 Simulation

- Along y-axis, position and angle dependency is shown to be drastic

- There is almost no difference of Npe in case of 0 deg and 5 deg



Plan on Simulation

- Scanning y axis position & angle dependence for kaon and proton
  - Determining the appropriate threshold
  - Same study for ELPH beam test (adequate threshold)