

Intermediate results

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Particles' properties:

- ① Particles: p^+ , muon as reference particle, e^- , pion, kaon
- ② Fixed distances: 0.1 mm, 2 mm, 4.8 mm
- ③ Momentum: 0.1 GeV, 1 GeV, 10 GeV
- ④ Finally $5 \cdot 3 \cdot 3 = 45$ data sets.

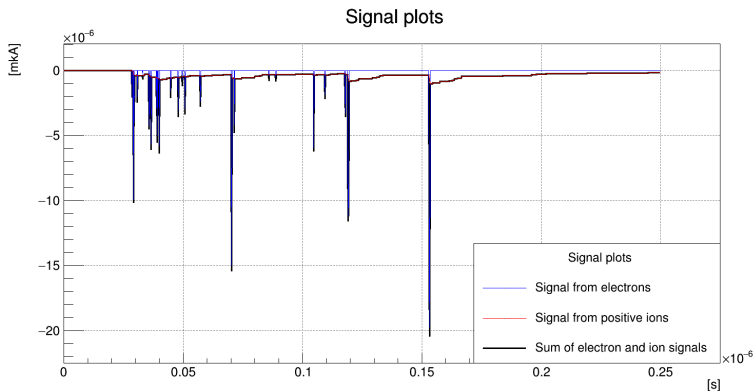


Рис. 1: Non-zero ion signal. 2 mm electron, 1 GeV energy

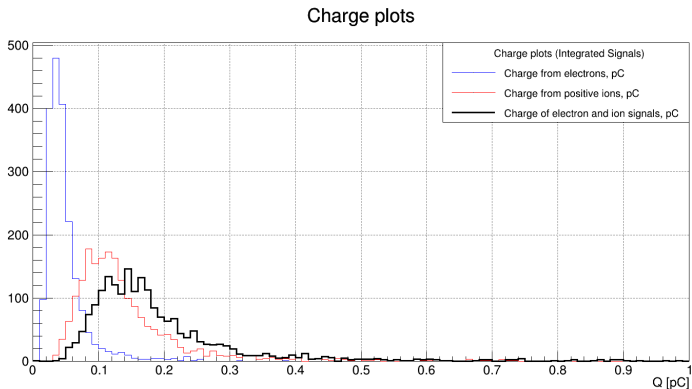


Рис. 2: Three parts of signal integrated [fC]. 2 mm electron, 1 GeV energy

Signal Integration (2)

Charge plots

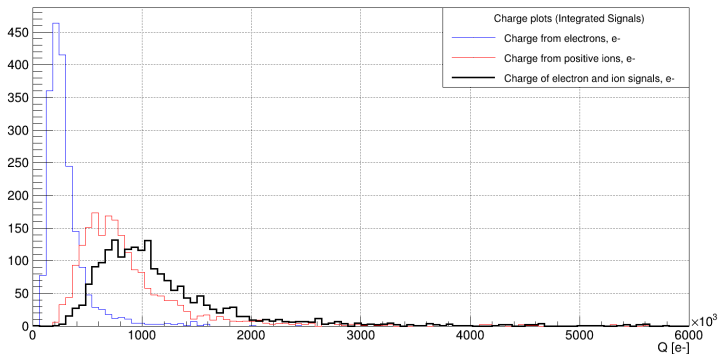


Рис. 3: Three parts of signal integrated [e-]. 2 mm electron, 1 GeV energy

Signal Integration (3)

Charge plots

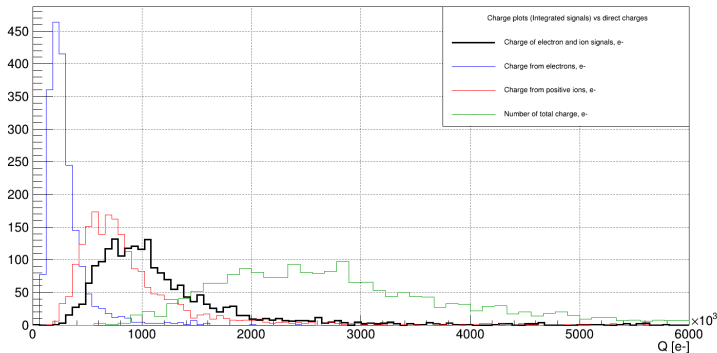
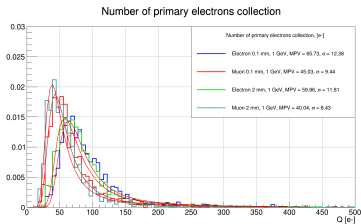
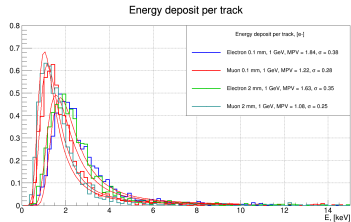


Рис. 4: Three parts of signal integrated [e-] vs total charge from Garfield++ (Green). 2 mm electron, 1 GeV energy

Energy, wasted on ion pair creation



a) Charge distribution per track, e^-



b) Energy deposit distribution per track, keV

Рис. 5: Compare of deposited energy and energy, wasted on ion pair creation.
 $1840/65.7 = 28 \text{ eV}$, $1220/45 = 27. \text{ eV}$, $1630/59.9 = 27.2 \text{ eV}$, $1080/40 = 27.0 \text{ eV}$.

Garfield++ vs Geant4, first cross-check (1)

Muon 1 GeV, 10 mm straw, distance = 2 mm

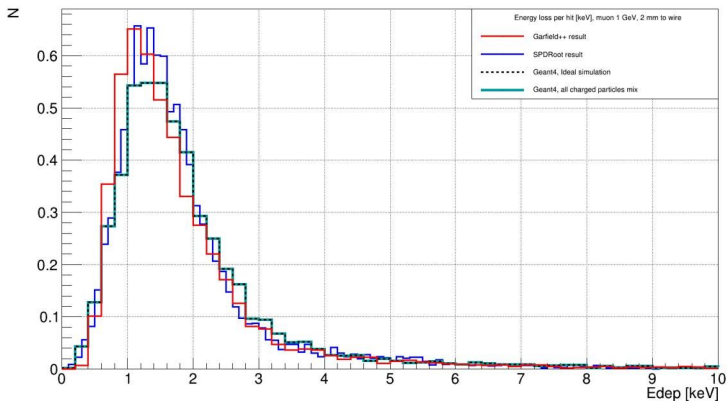


Рис. 6: Compare two physics lists in Geant4 vs Garfield++ vs SPDRRoot (No magnetic!). Muon 2 mm, 1 GeV

Garfield++ vs Geant4, first cross-check (2)

Proton 0.1 GeV, 10 mm straw, distance = 2 mm

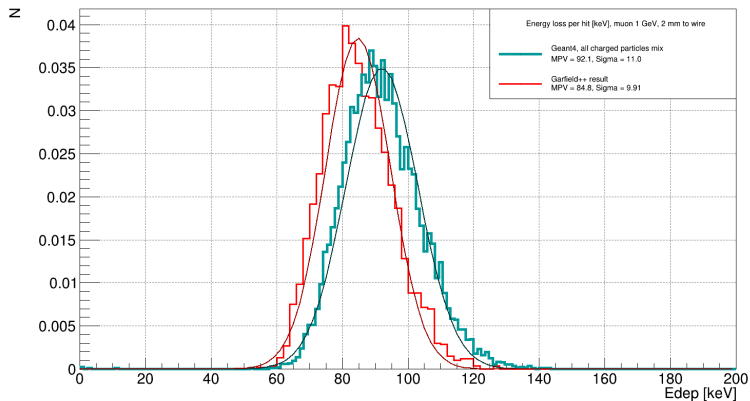


Рис. 7: Geant4 vs Garfieldpp. Proton 0.1 GeV momentum, Distance 2 mm

Garfield++ vs Geant4, first cross-check (3)

Proton 1 GeV, 10 mm straw, distance = 2 mm

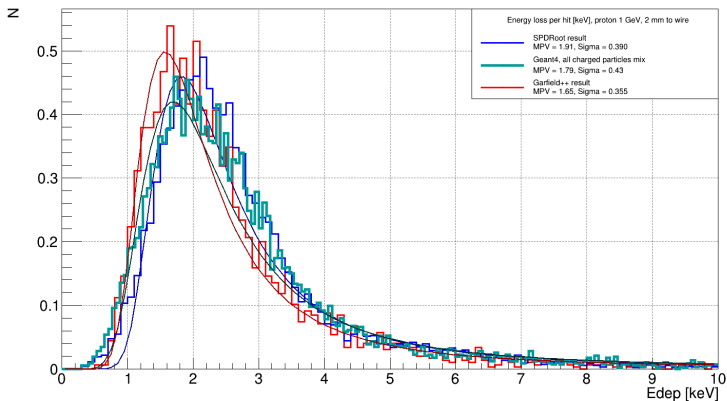


Рис. 8: Geant4 vs Garfieldpp. Proton 1 GeV momentum, Distance 2 mm

Energy loss of a track, electron, momentum = 0.1 GeV

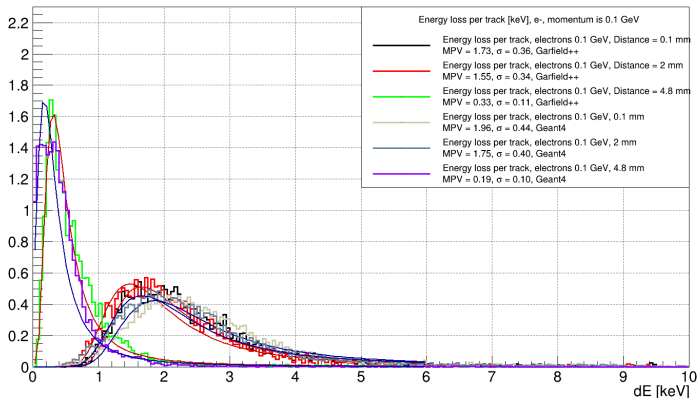


Рис. 9: Geant4 vs Garfieldpp. Electron, momentum 0.1 GeV

Energy loss of a track, electron, momentum = 1 GeV

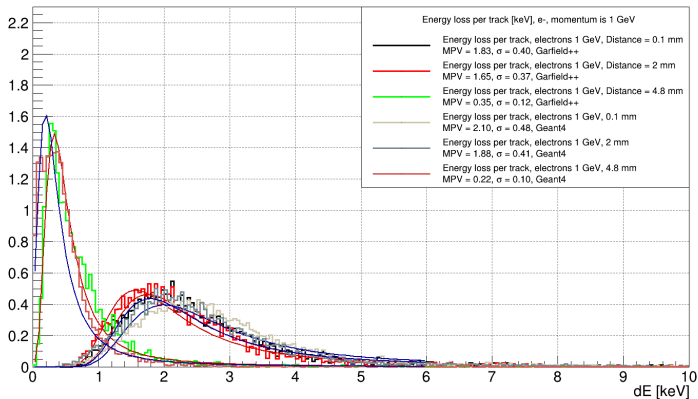


Рис. 10: Geant4 vs Garfieldpp. Electron, momentum 1 GeV

Energy loss of a track, electron, momentum = 10 GeV

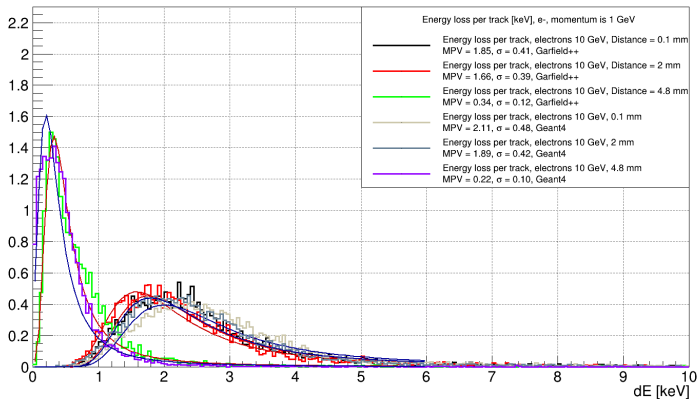


Рис. 11: Geant4 vs Garfieldpp. Electron, momentum 10 GeV

Energy loss of a track, K-, momentum = 0.1 GeV

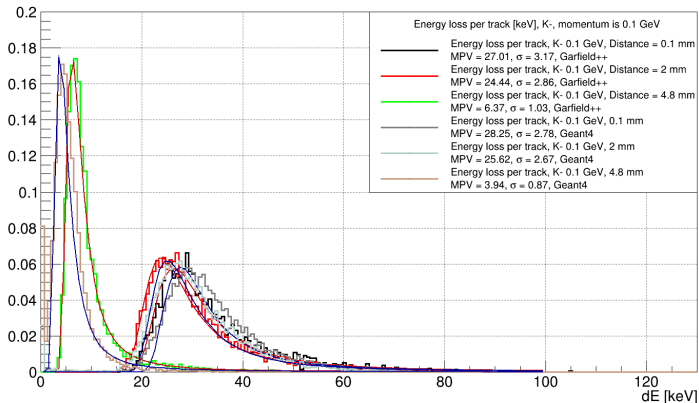


Рис. 12: Geant4 vs Garfieldpp. Каон (K-), momentum 0.1 GeV

Energy loss of a track, kaon, momentum = 1 GeV

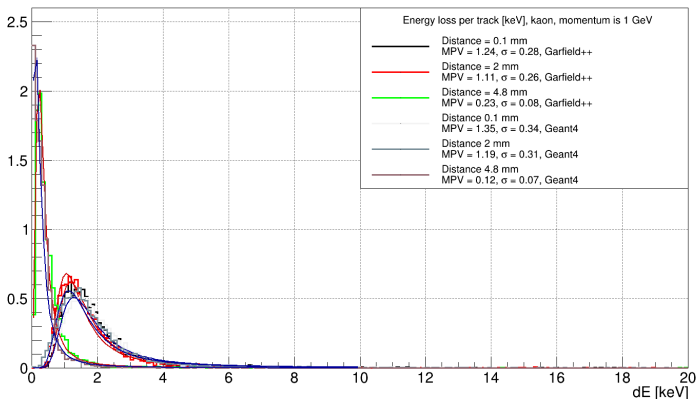


Рис. 13: Geant4 vs Garfieldpp. Каон (K-), momentum 1 GeV

Energy loss of a track, kaon, momentum = 10 GeV

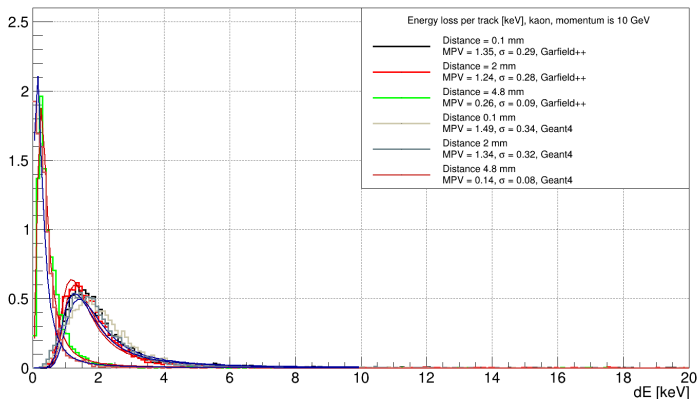


Рис. 14: Geant4 vs Garfieldpp. Kaon (K-), momentum 10 GeV

Energy loss of a track, muon, momentum = 0.1 GeV

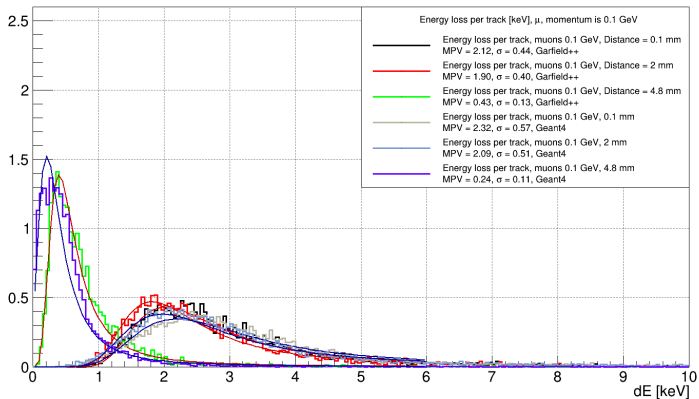


Рис. 15: Geant4 vs Garfieldpp. Muon, momentum 0.1 GeV

Energy loss of a track, muon, momentum = 1 GeV

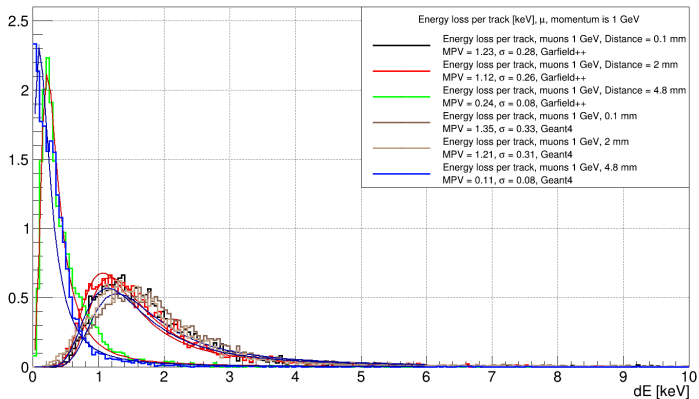


Рис. 16: Geant4 vs Garfieldpp. Muon, momentum 1 GeV

Energy loss of a track, muon, momentum = 10 GeV

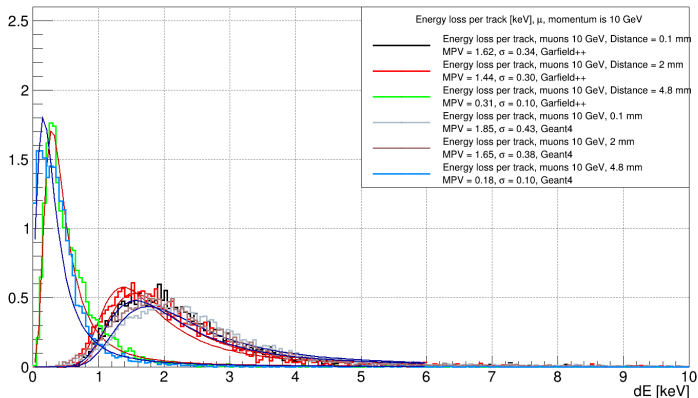


Рис. 17: Geant4 vs Garfieldpp. Muon, momentum 10 GeV

Energy loss of a track, pion, momentum = 0.1 GeV

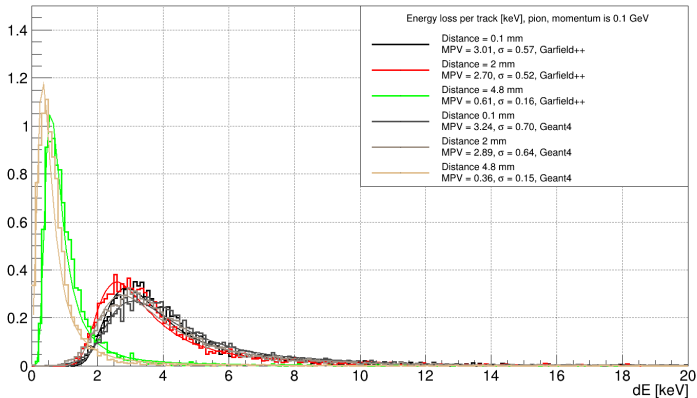


Рис. 18: Geant4 vs Garfieldpp. π^- , momentum 0.1 GeV

Energy loss of a track, π^- , momentum = 1 GeV

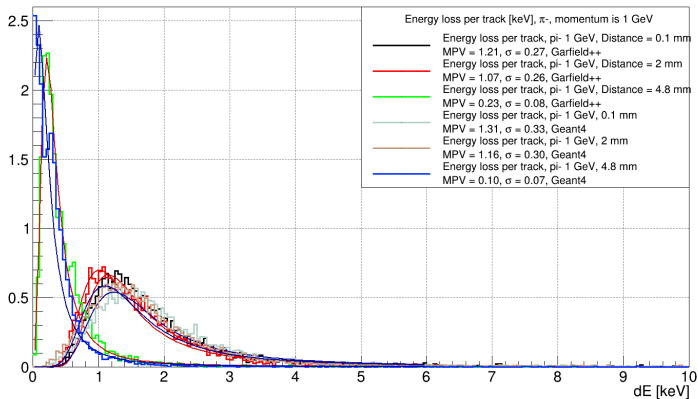


Рис. 19: Geant4 vs Garfieldpp. π^- , momentum 1 GeV

Energy loss of a track, π^- , momentum = 10 GeV

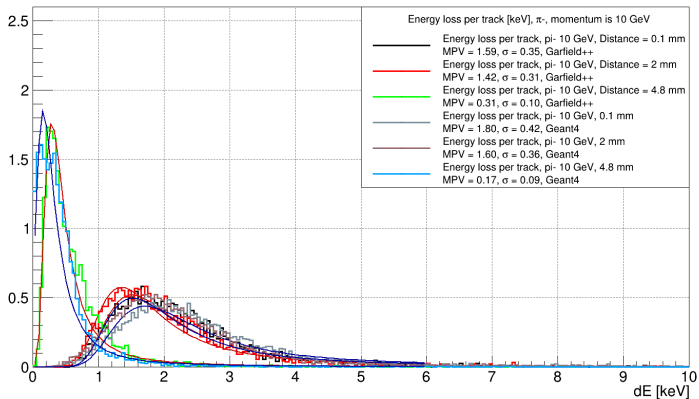


Рис. 20: Geant4 vs Garfieldpp. π^- , momentum 10 GeV

Energy loss of a track, proton, momentum = 0.1 GeV

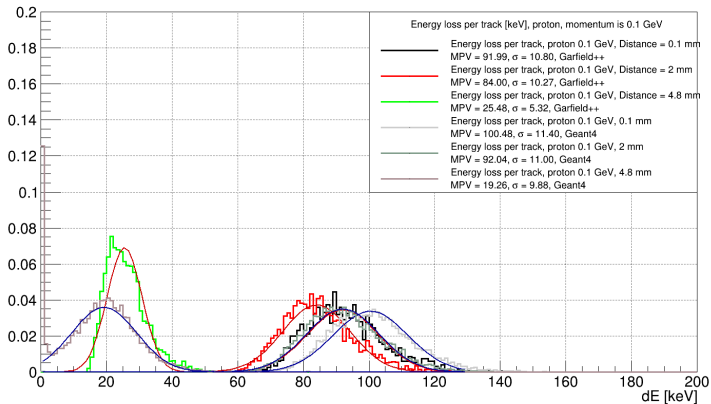


Рис. 21: Geant4 vs Garfieldpp. Proton, momentum 0.1 GeV

Energy loss of a track, proton, momentum = 1 GeV

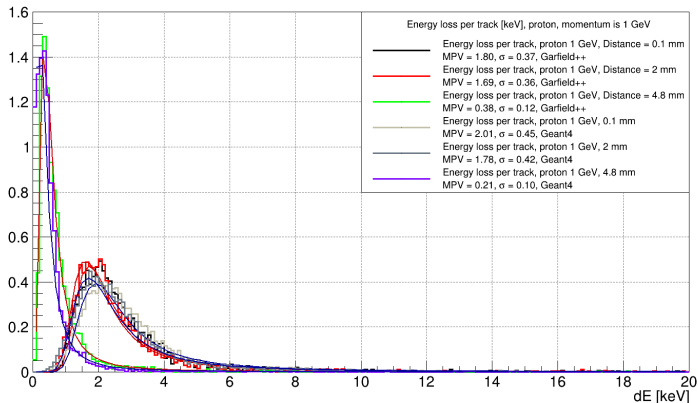


Рис. 22: Geant4 vs Garfieldpp. Proton, momentum 1 GeV

Energy loss of a track, proton, momentum = 10 GeV

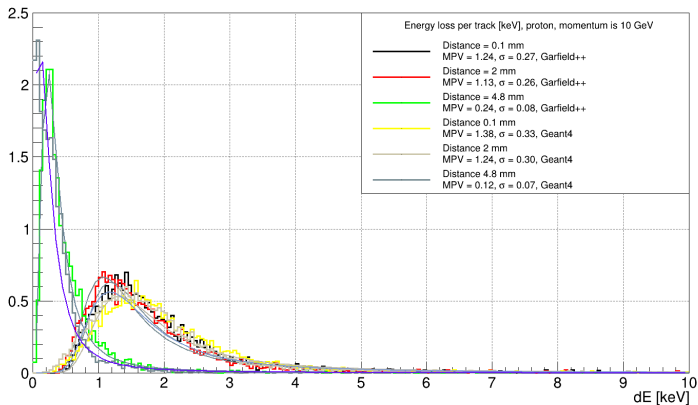
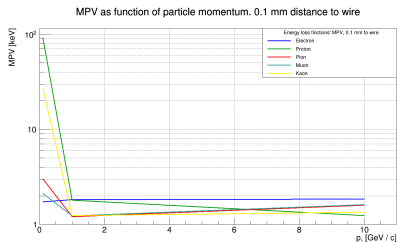
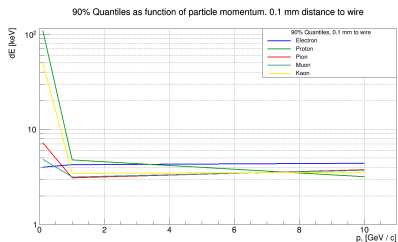


Рис. 23: Geant4 vs Garfieldpp. Proton, momentum 10 GeV

MPV and 90% Quantiles, as functions from particle momentum, 0.1 mm



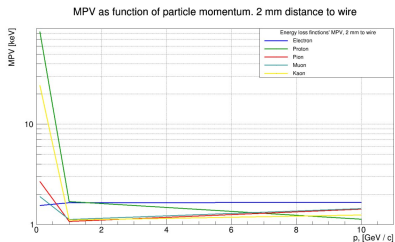
a)



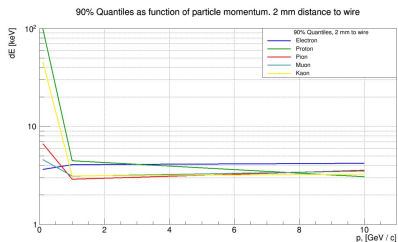
b)

Рис. 24: (a) MPV (b) 90% Quantile, 0.1 mm

MPV and 90% Quantiles, as functions from particle momentum, 2 mm



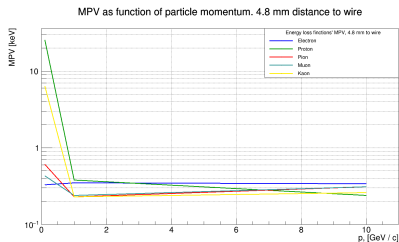
a)



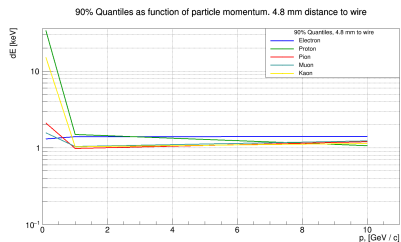
b)

Рис. 25: (a) MPV (b) 90% Quantile, 2 mm

MPV and 90% Quantiles, as functions from particle momentum, 4.8 mm



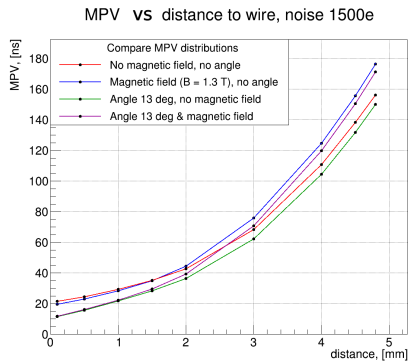
a)



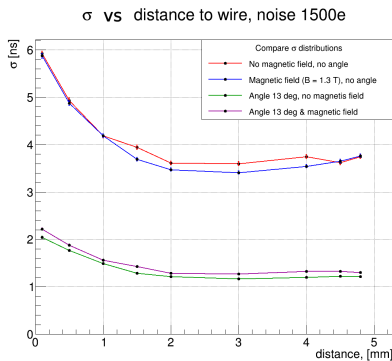
b)

Рис. 26: (a) MPV (b) 90% Quantile, 4.8 mm

MPV and Sigma, previous parametrisation



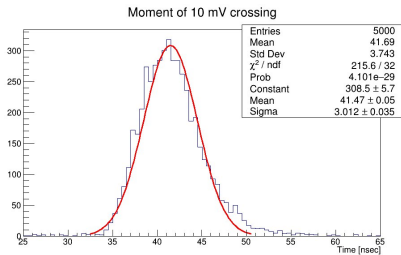
a)



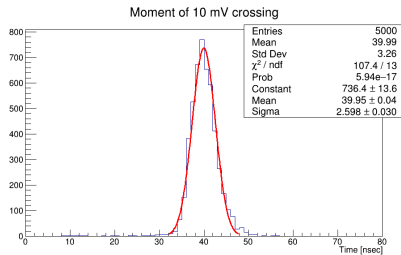
b)

Рис. 27: Muon 1 GeV ENERGY, (a) MPV (ns) and (b) σ (ns) dependence from distance to wire

MPV and Sigma, proton and muon compare



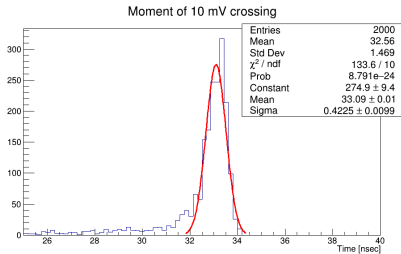
a)



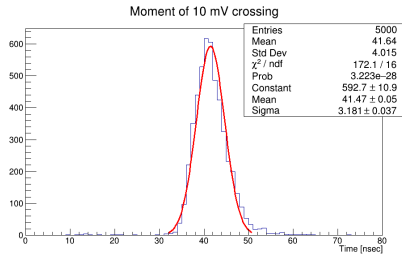
b)

Рис. 28: (a) Signal of Muon, 1 GeV, 2 mm (b) Signal of proton, 1 GeV, 2 mm

MPV and Sigma, proton compare



a)



b)

Рис. 29: (a) Signal of proton, 0.1 GeV, 2 mm (b) Signal of proton, 10 GeV, 2 mm