FRED update: Delta-rays

Fred-Fluka AirBoneBrain

ARPG meeting

10/07/2020

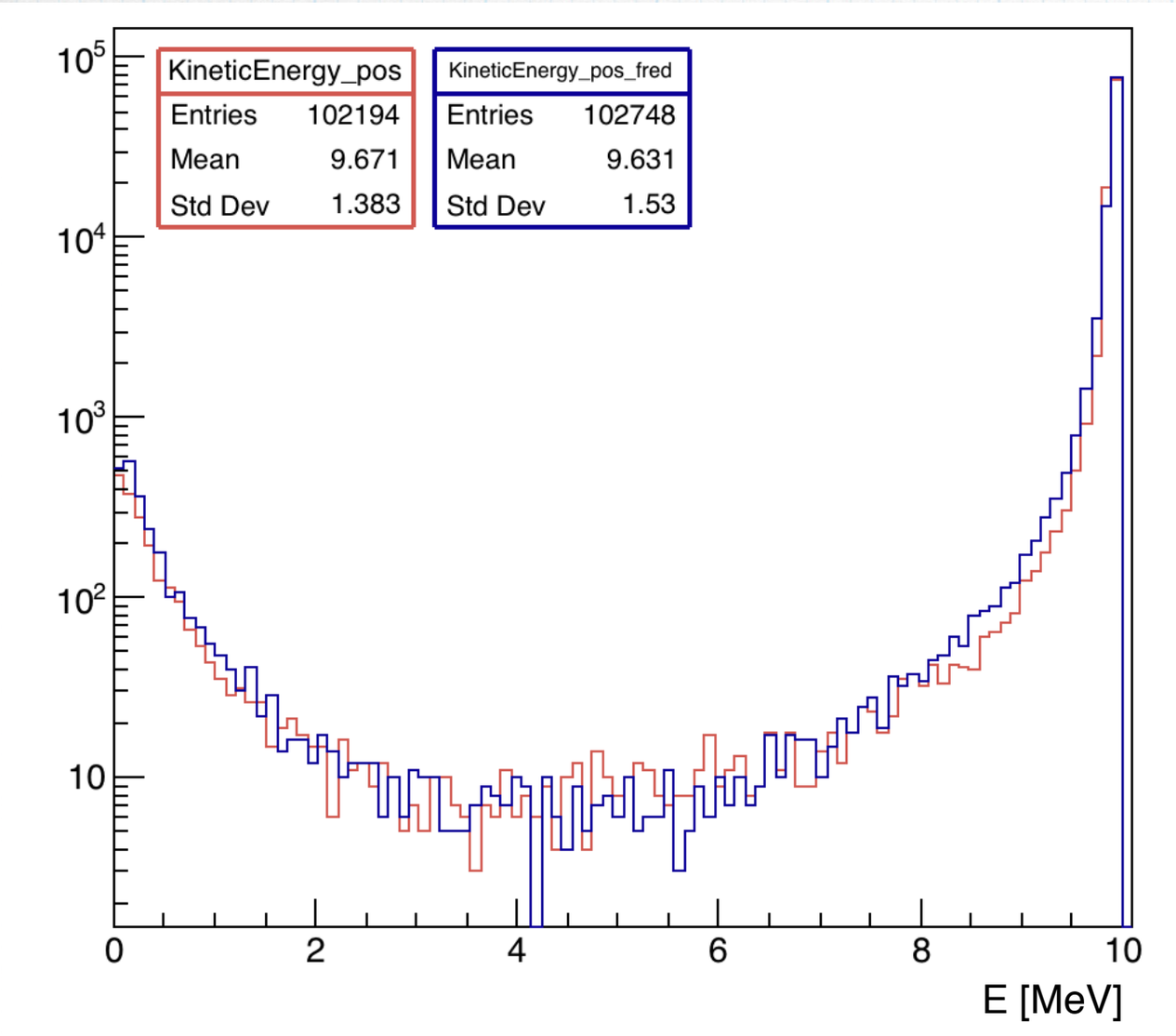
Gaia Franciosini, Marta Fischietti

Fluka Fred comparison

FLUKA FRED

To test the delta-rays implantation in Fred I have simulated 1e5 electrons with 10 MeV energy impinging on a 250 μm thick aluminum target.

Outgoing electrons energy spectrum



logscale

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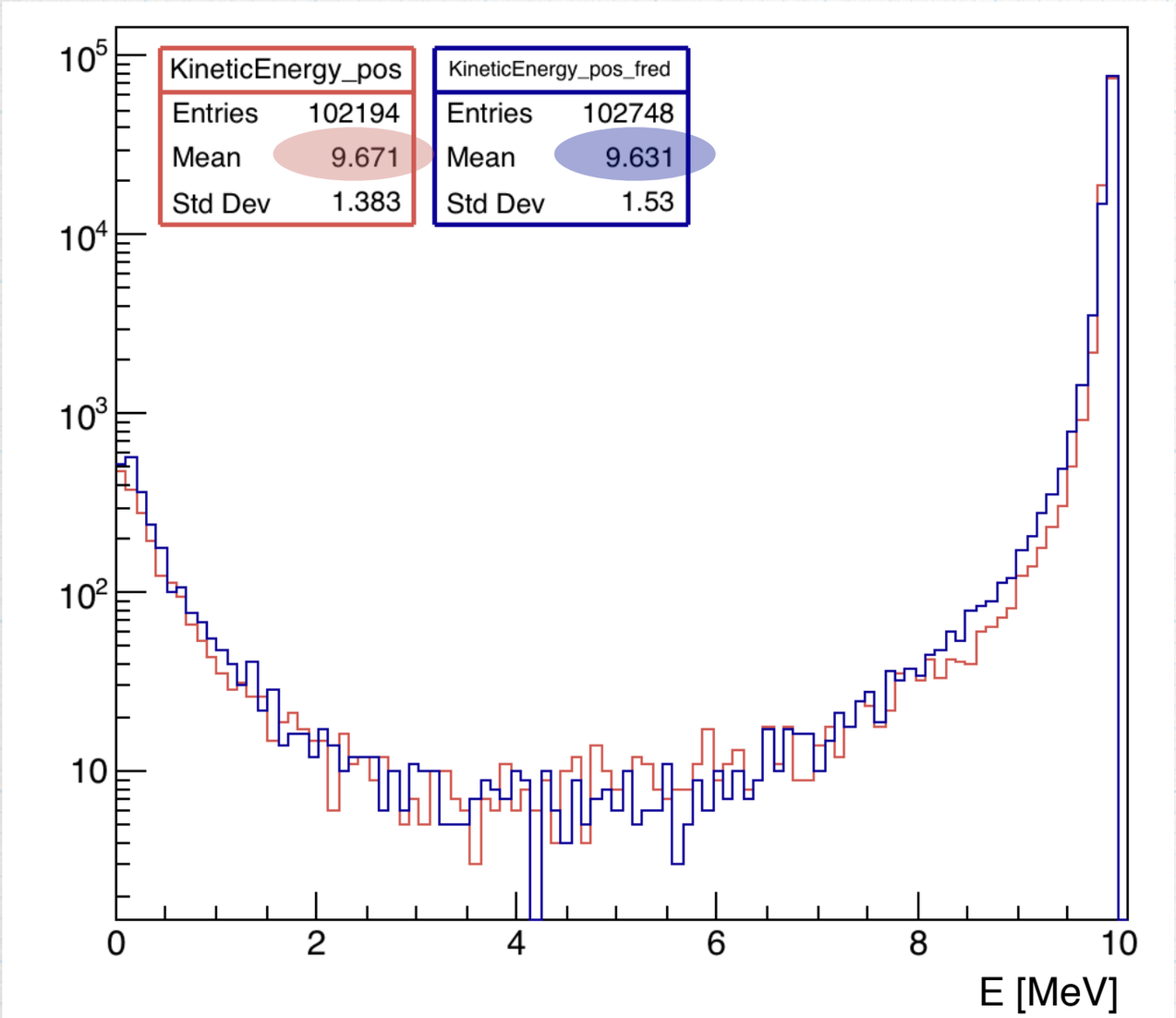
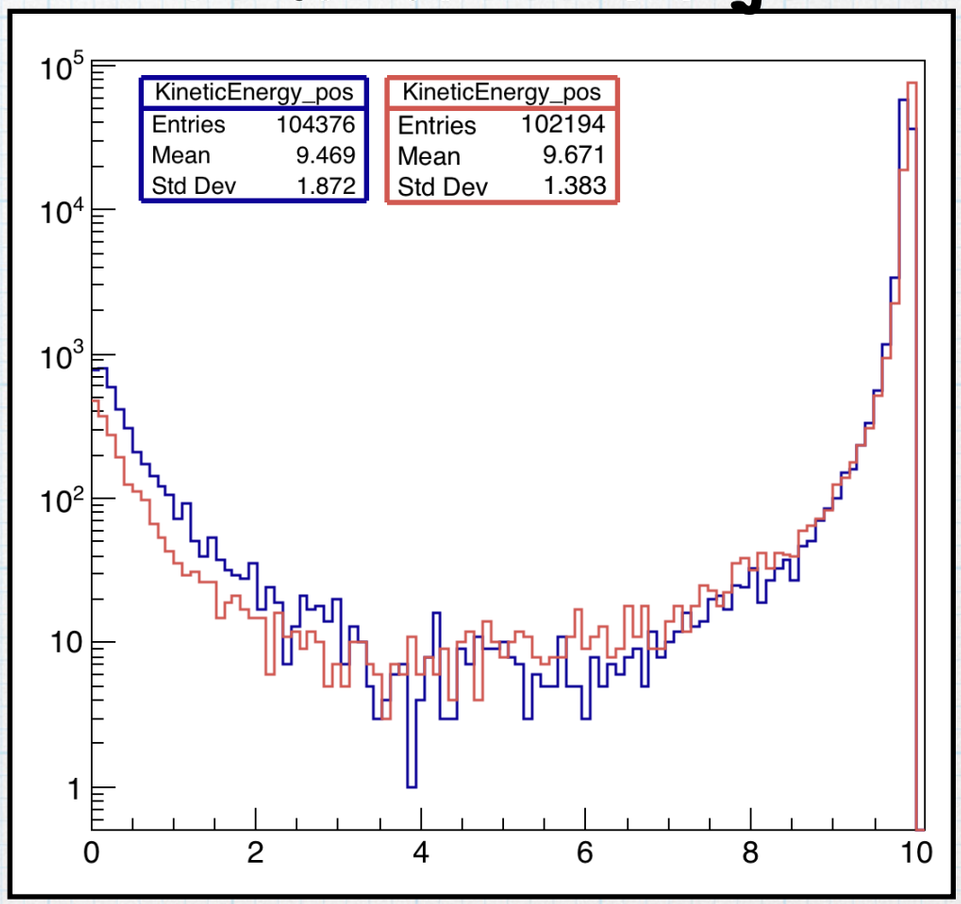


Some weeks ago



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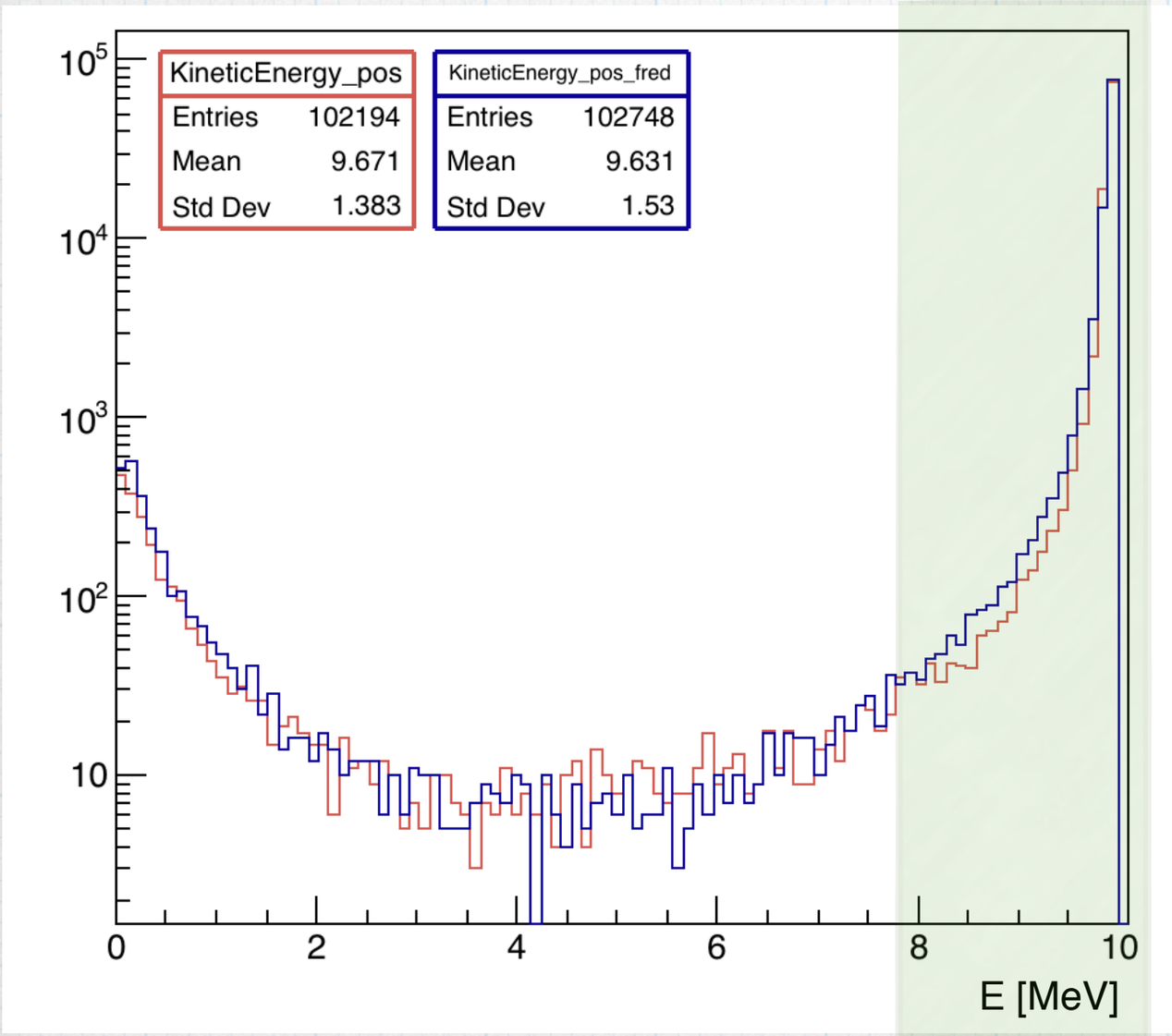

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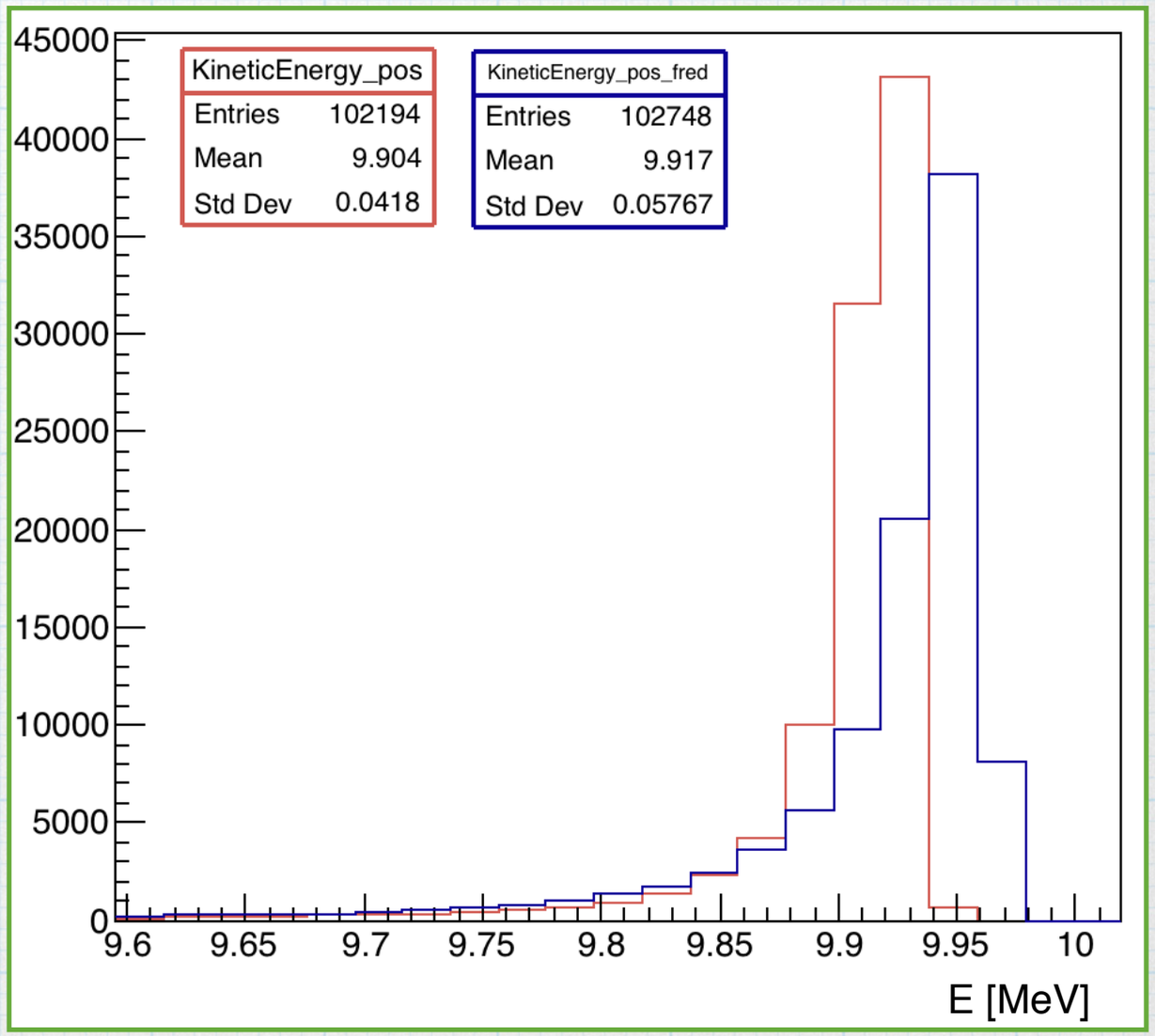

linear scale

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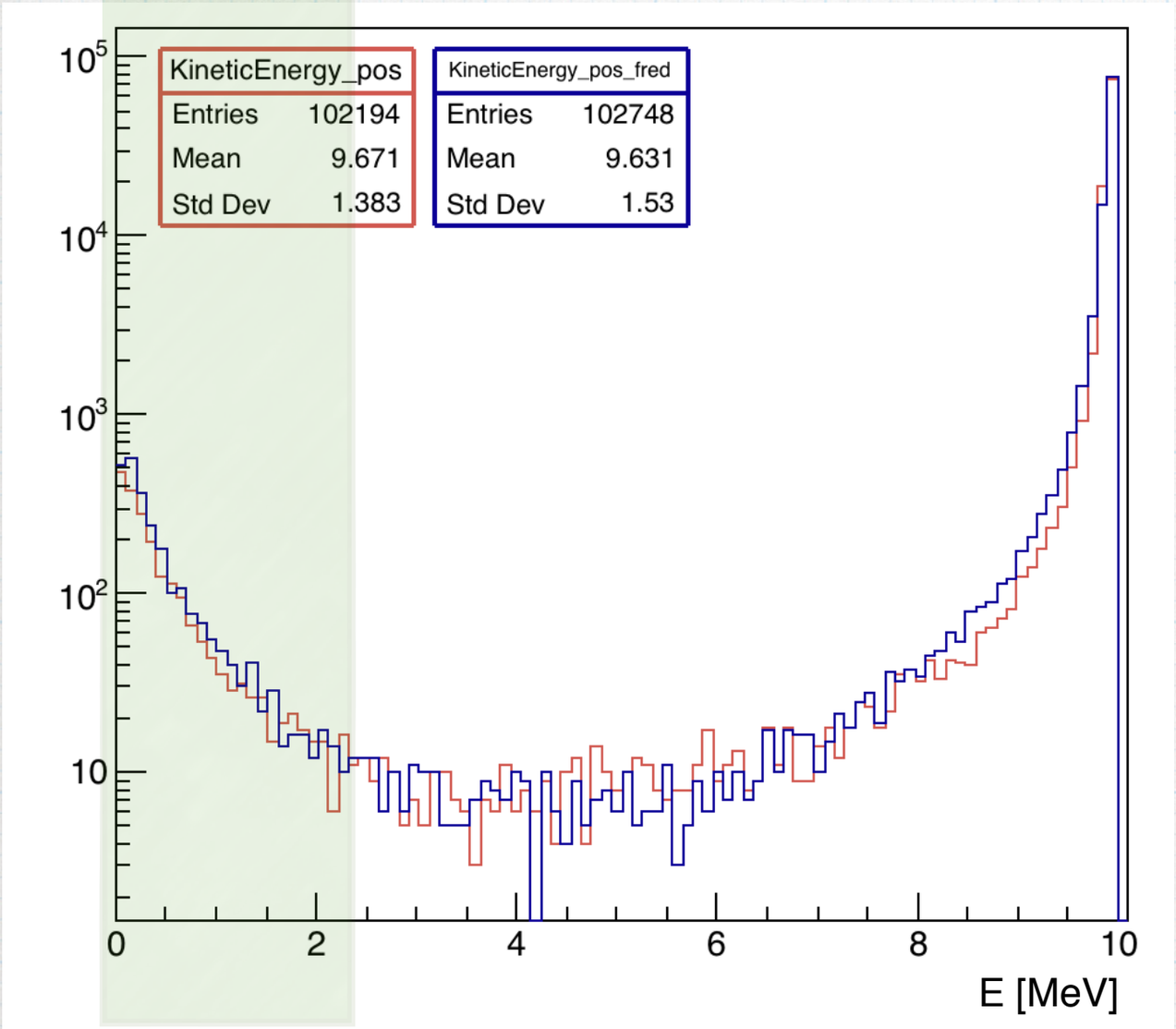
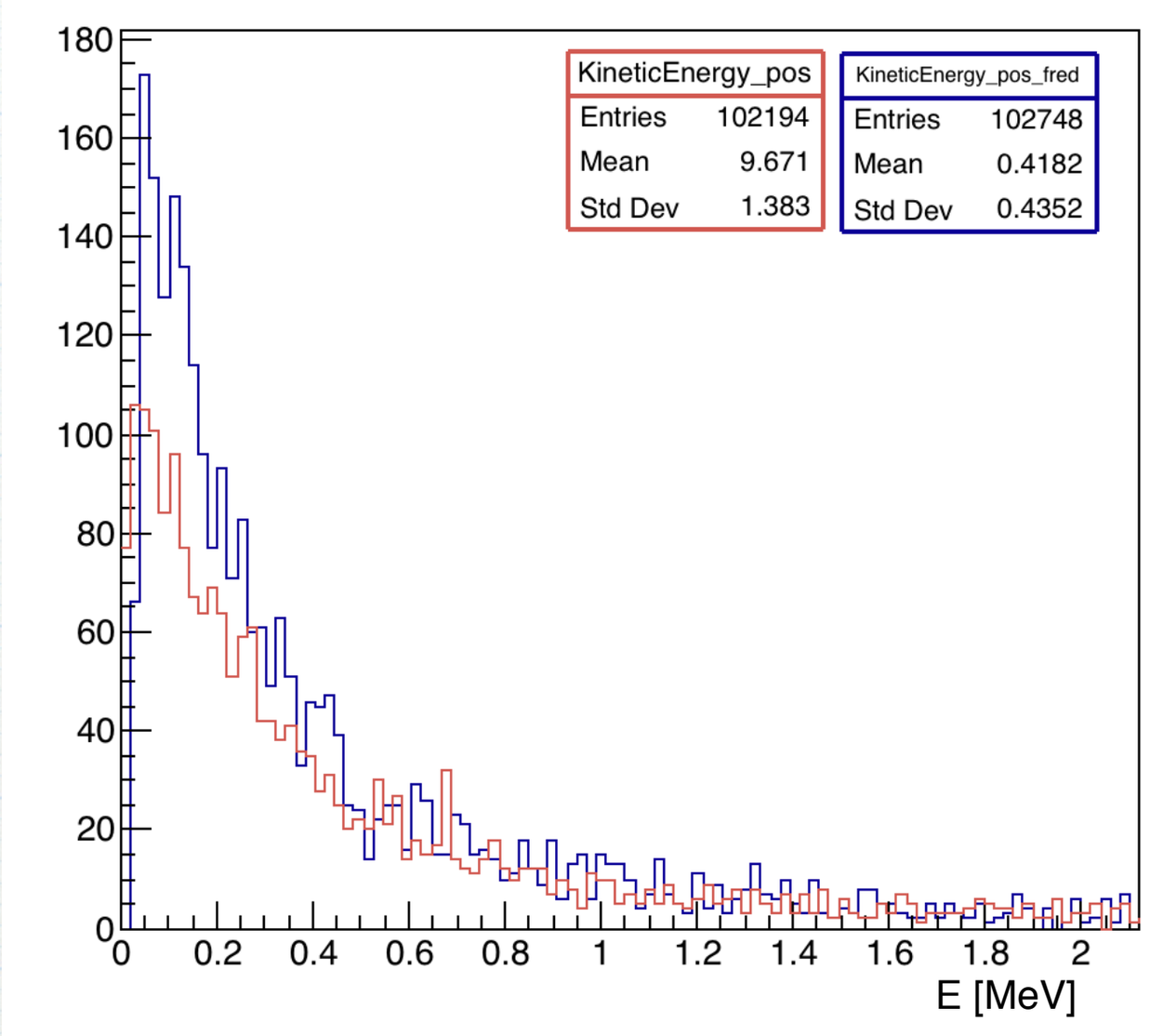


logscale



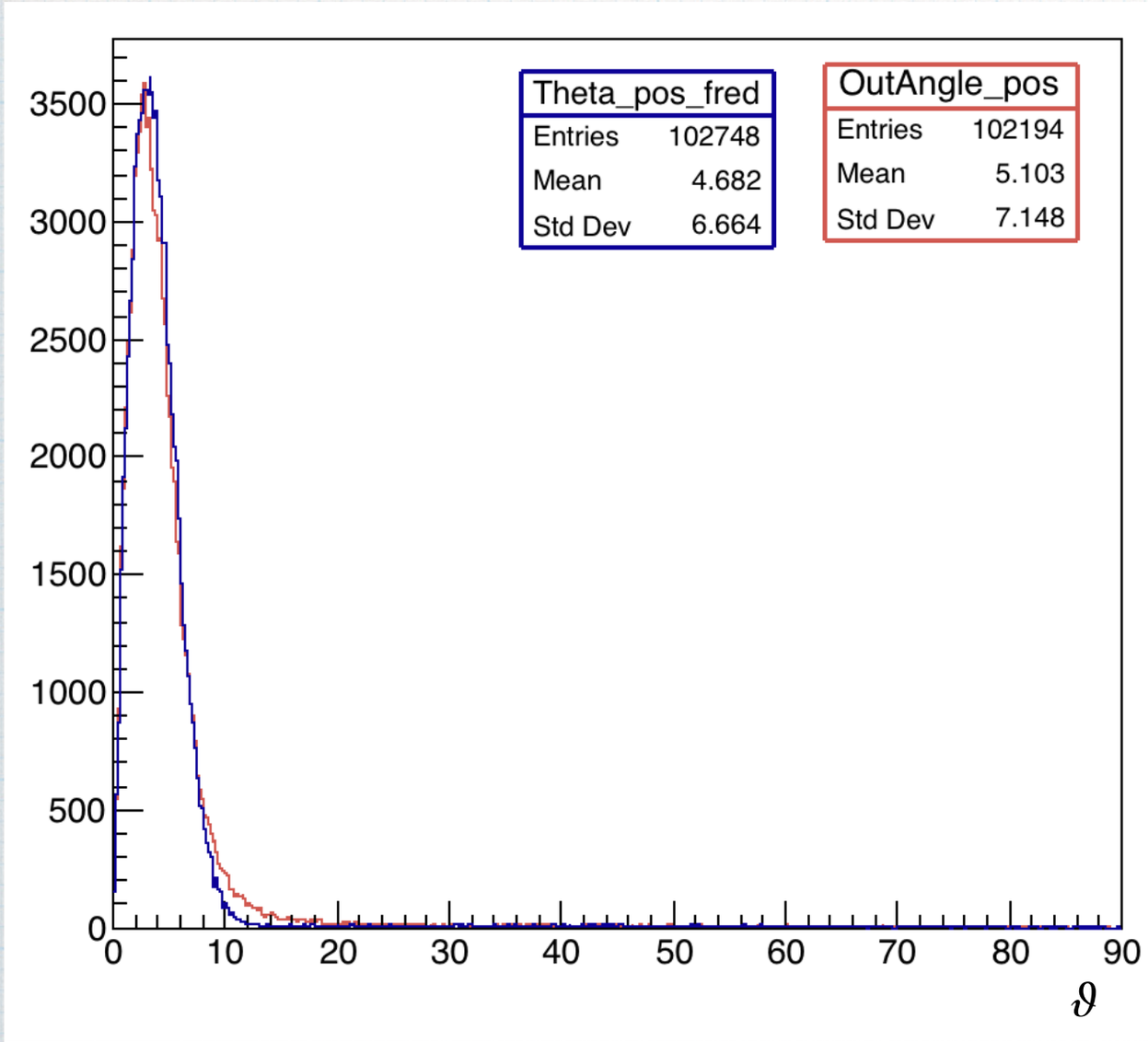
linear scale

Fluka Fred comparison

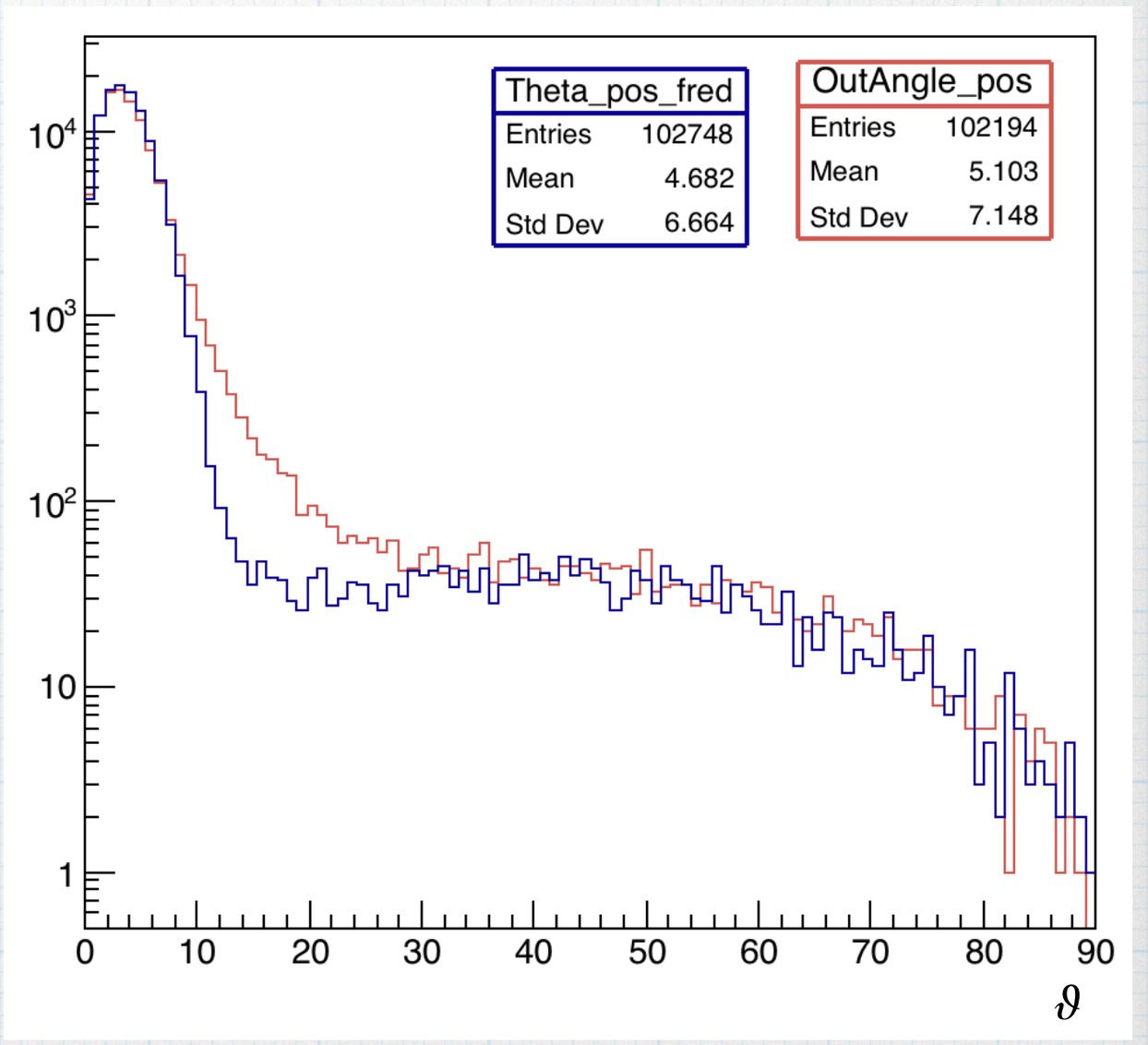
FLUKA FRED

To test the delta-rays implantation in Fred I have simulated 1e6 electrons with 10 MeV energy impinging on a 250 μm thick aluminum target.

Outgoing electrons angular spectrum



linear scale



logscale

Fluka Fred comparison

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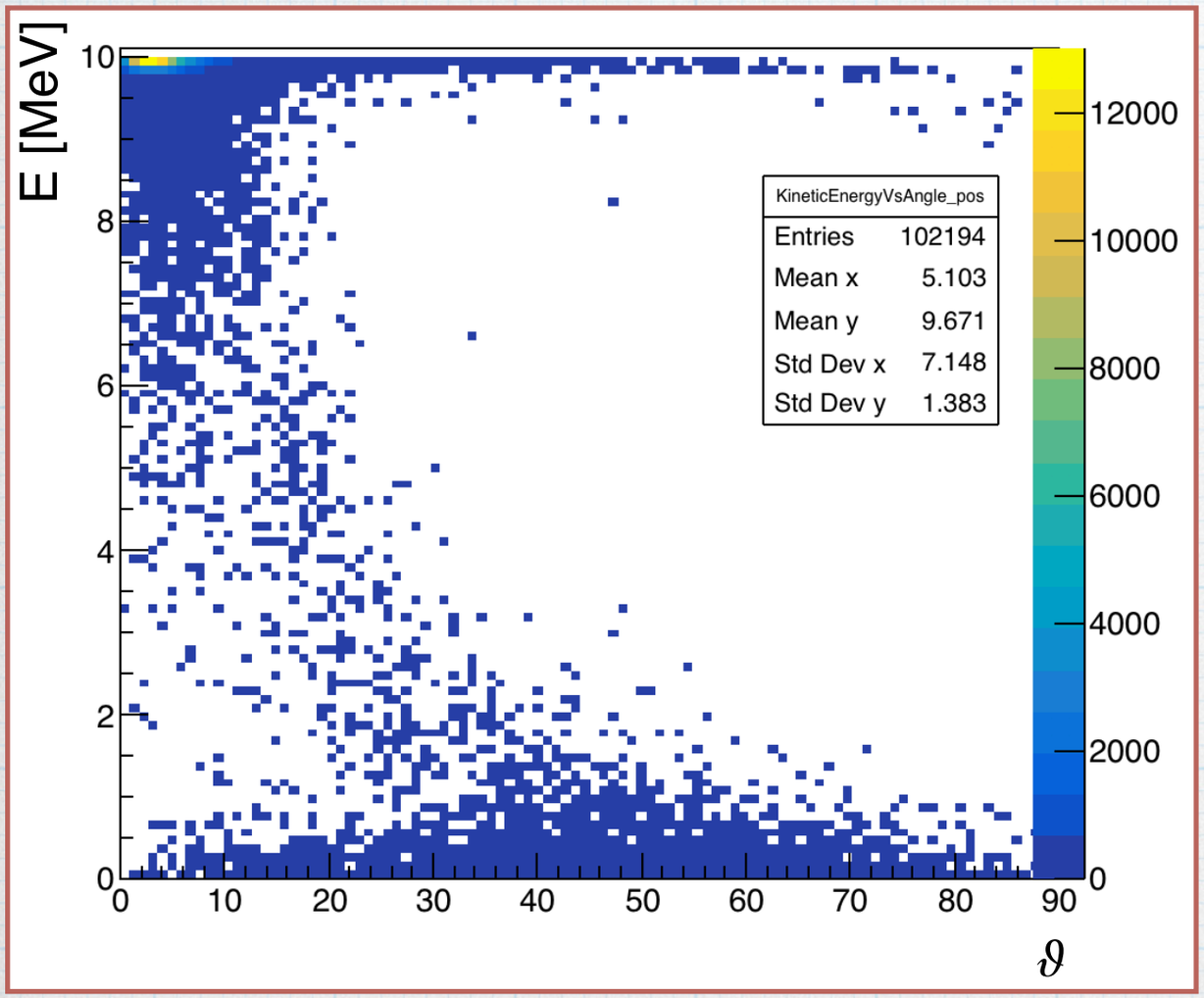
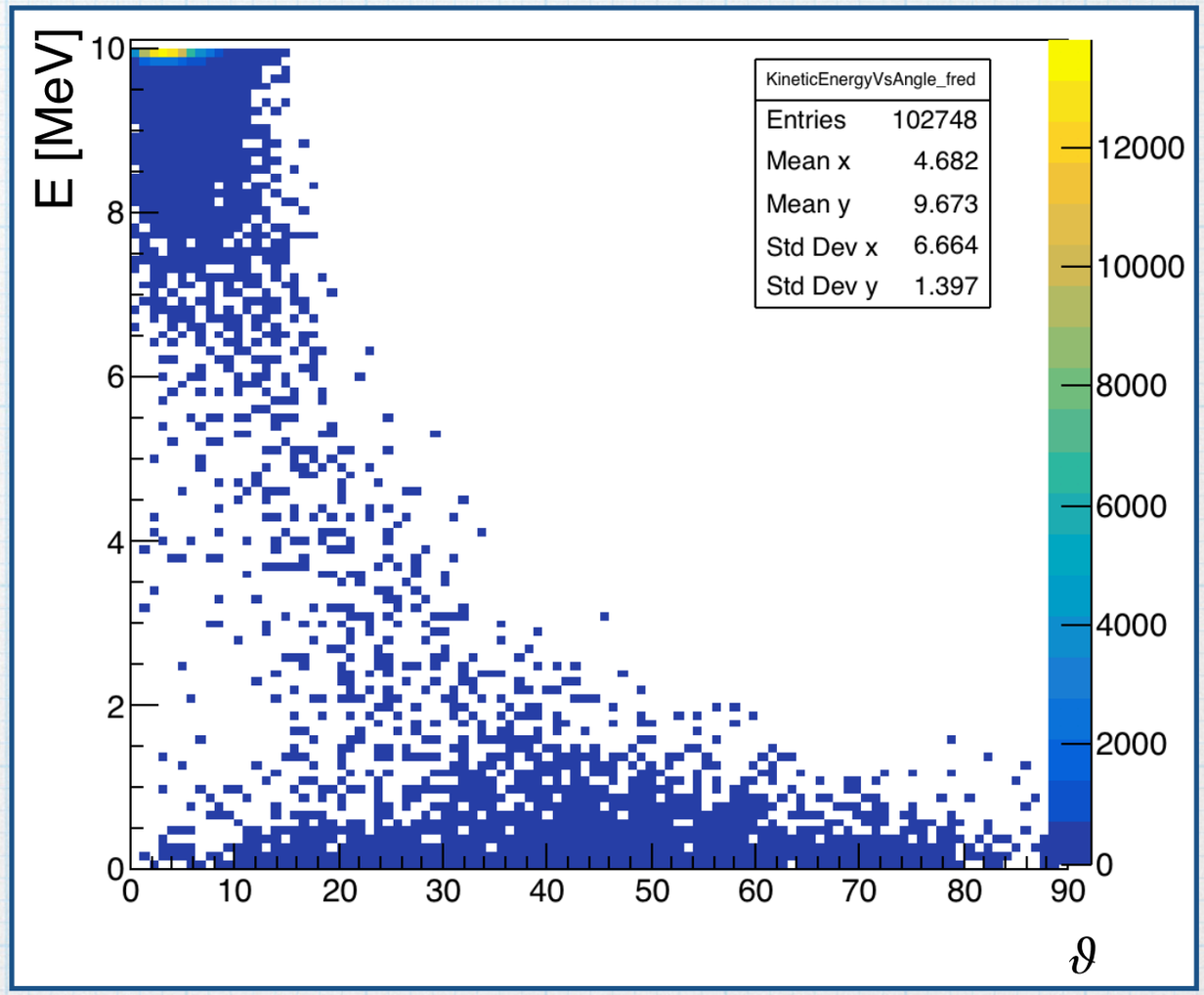
H2D: Energy and angle of the outgoing electrons



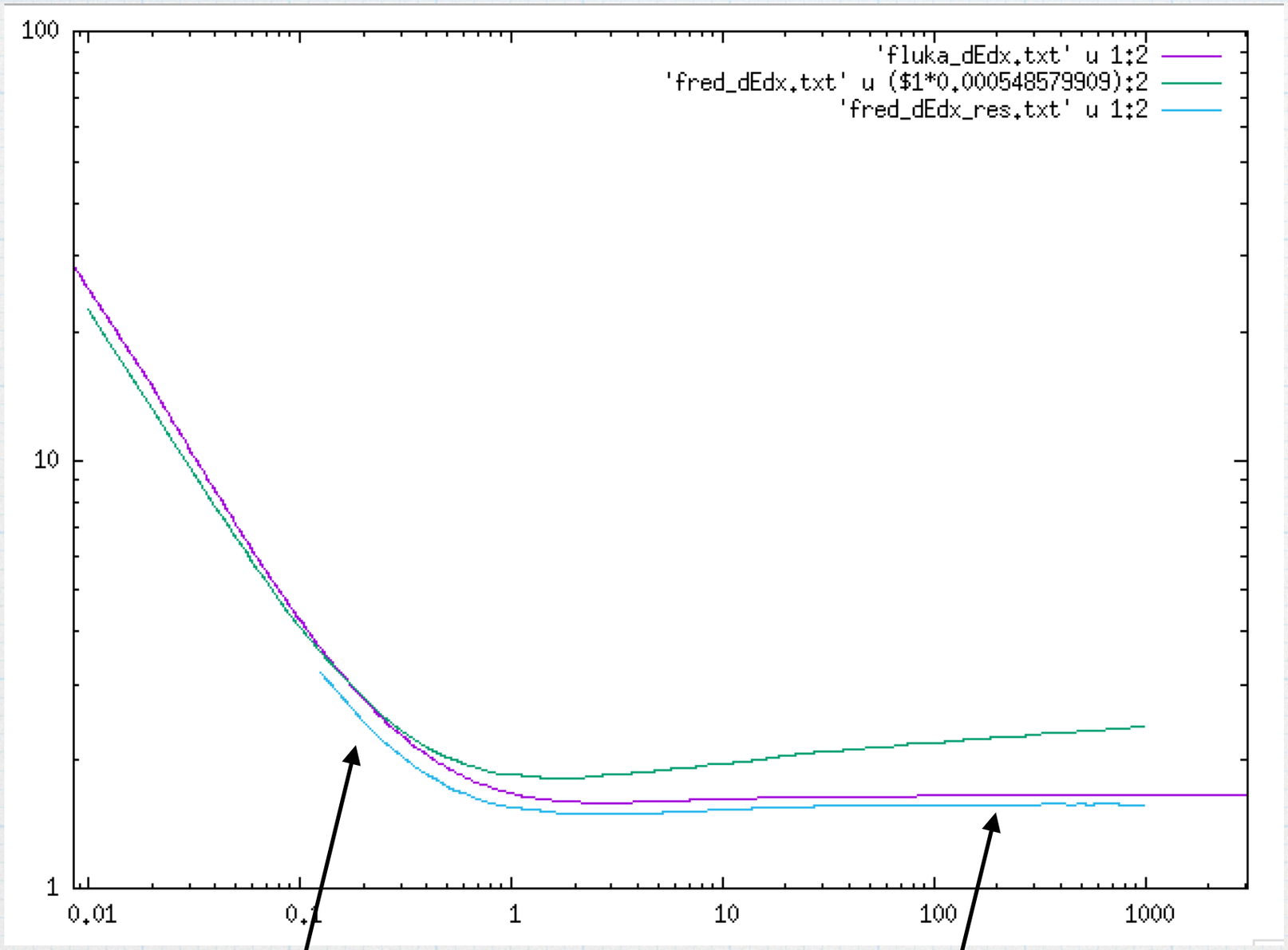
FLUKA



FRED

Fluka Fred comparison

dEds improvement



dEdx in water

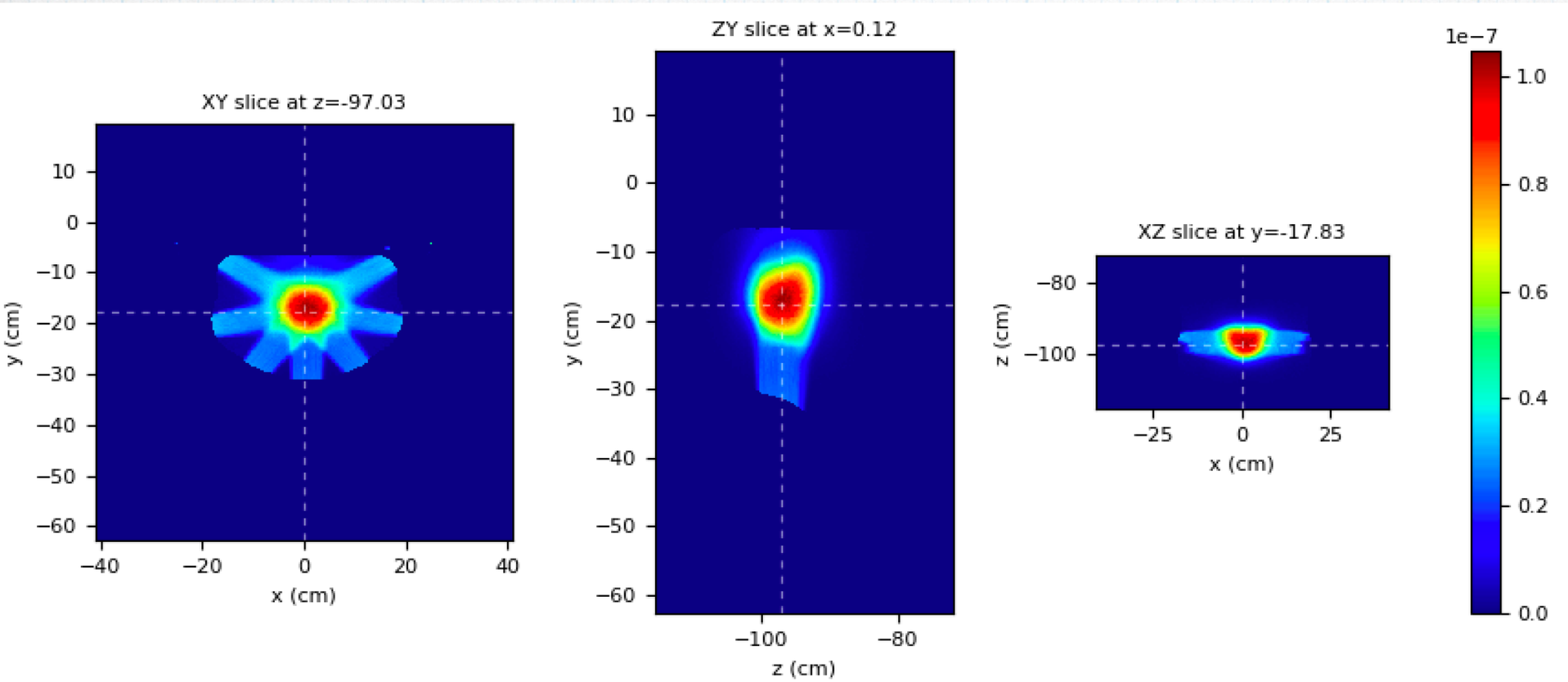
Unrestriced Fred dEdx

Fluka dEdx

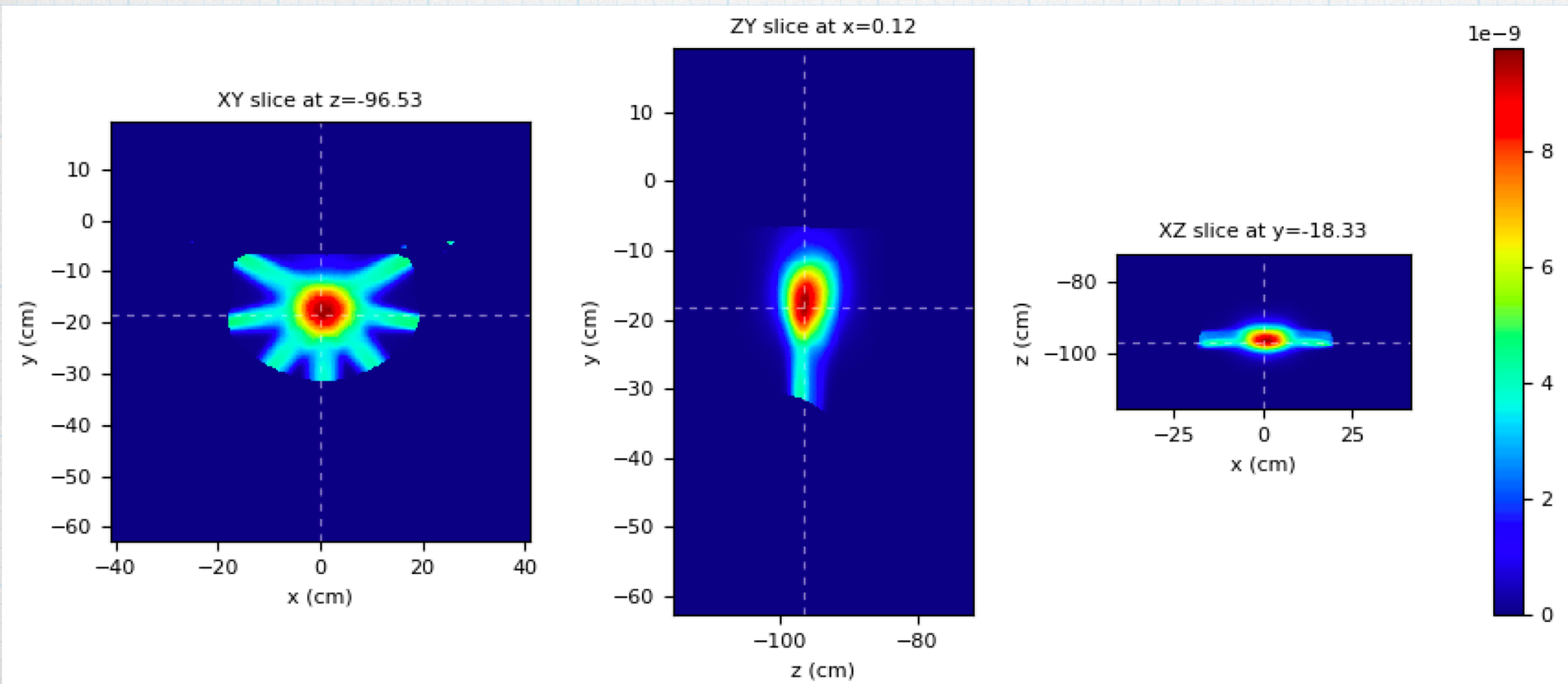
Restriced Fred dEdx

Tombolini's prostata

70 MeV



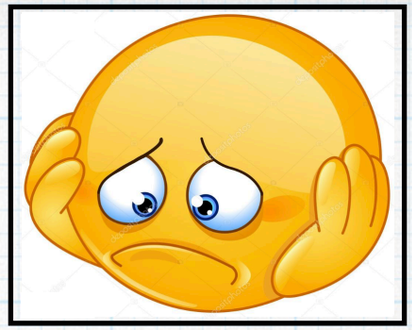
FRED–> sum: 1.2e–2 Gy/ electron

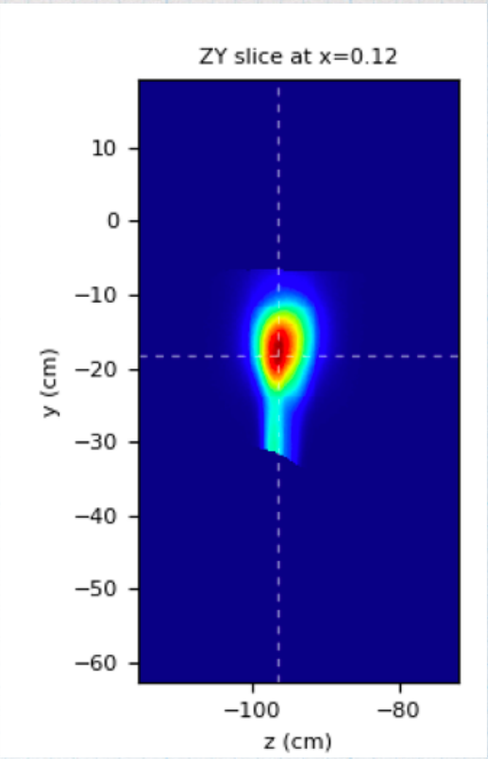


FLUKA–> sum: 9.16e–4 Gy/ electron

Fluka-Fred comparison didn't go so well

Tombolini's prostata



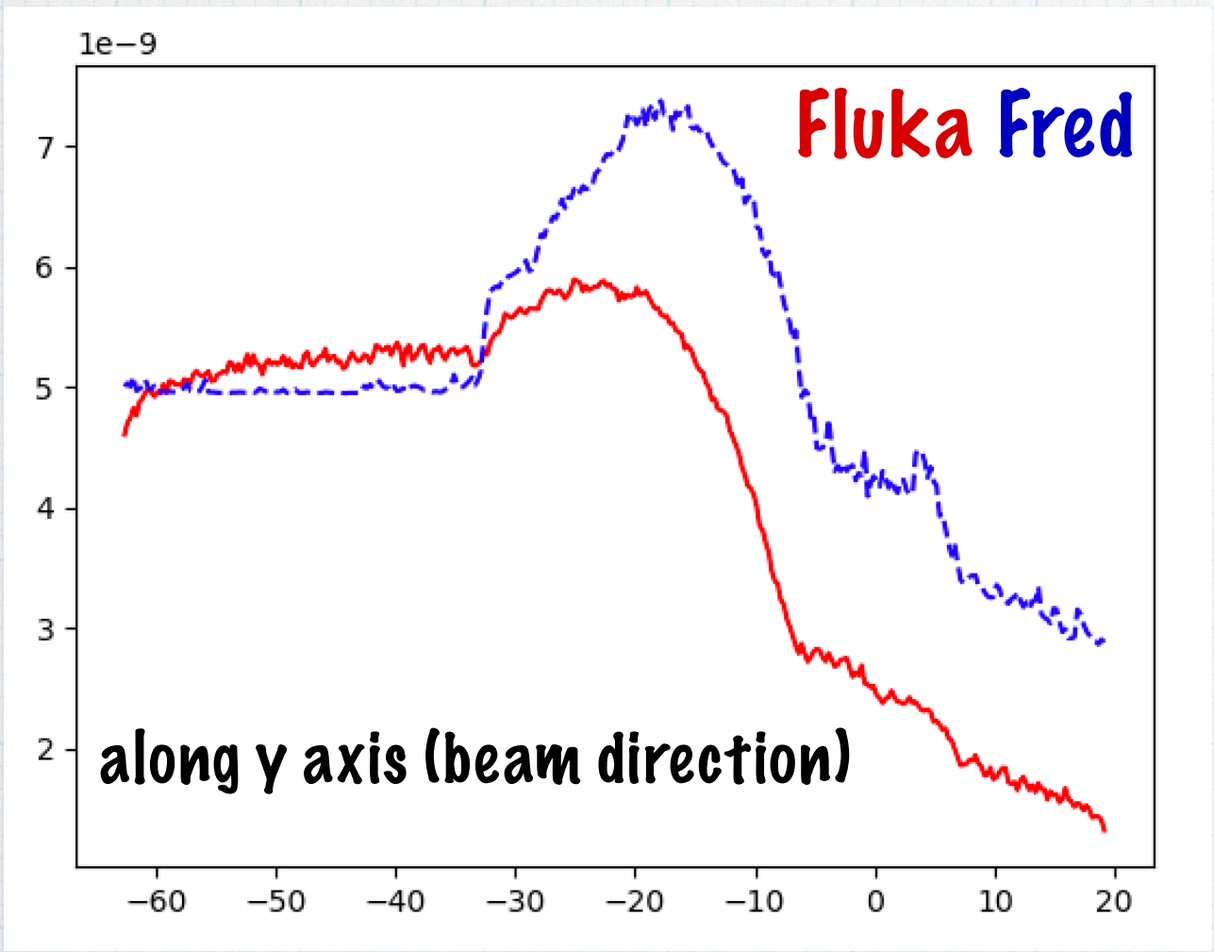


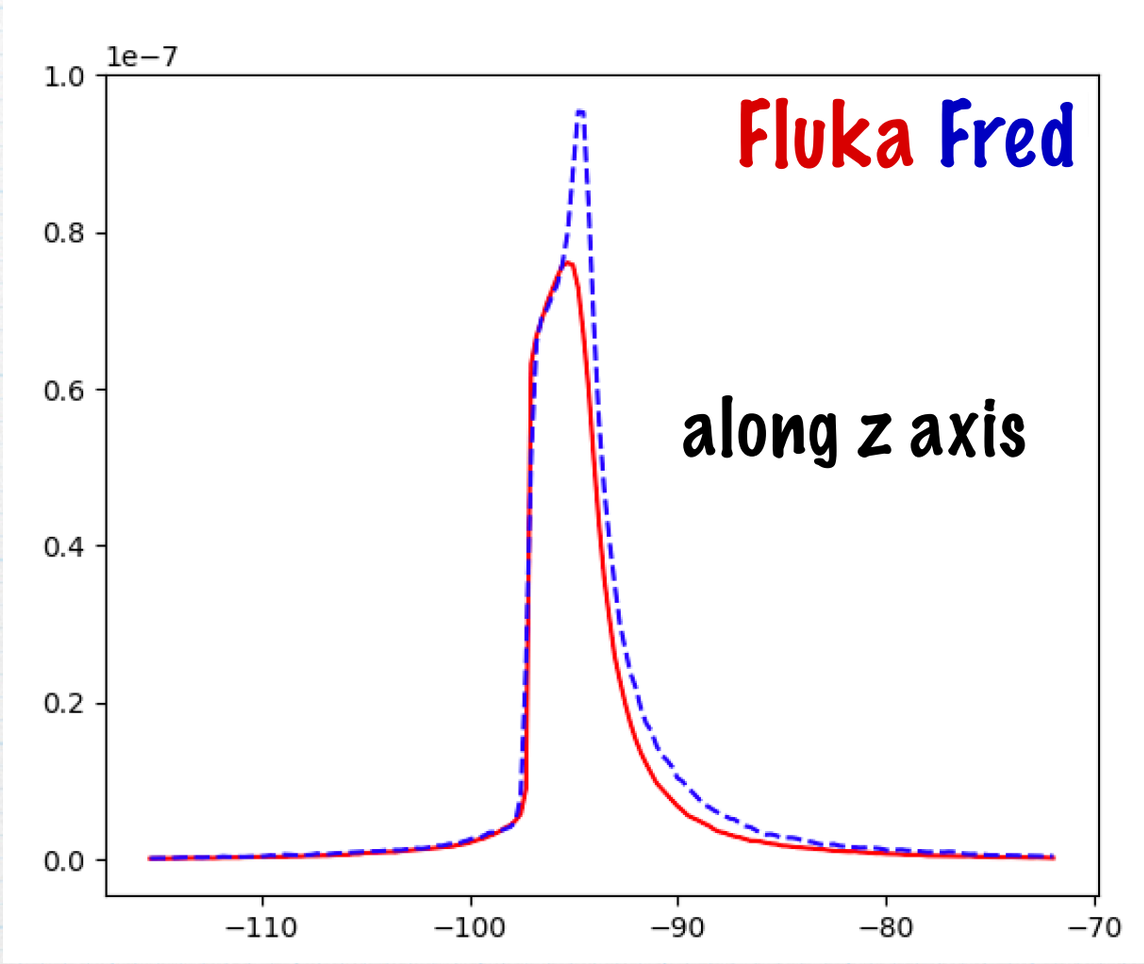
one pencil beam

70 MeV

FLUKA->sum:1.38e-06 Gy/electron

FRED->sum:1.68e-06 Gy/electron





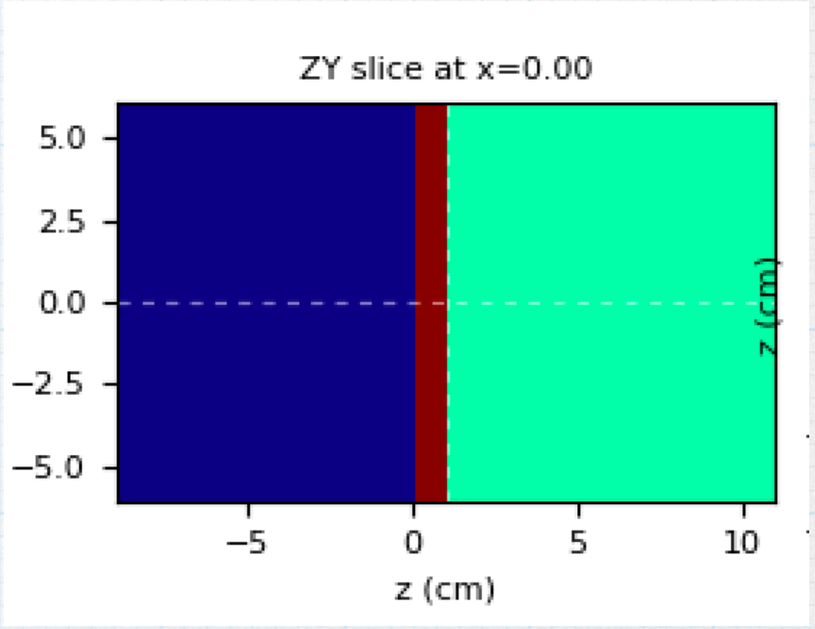
Simple example to validate fred/fluka

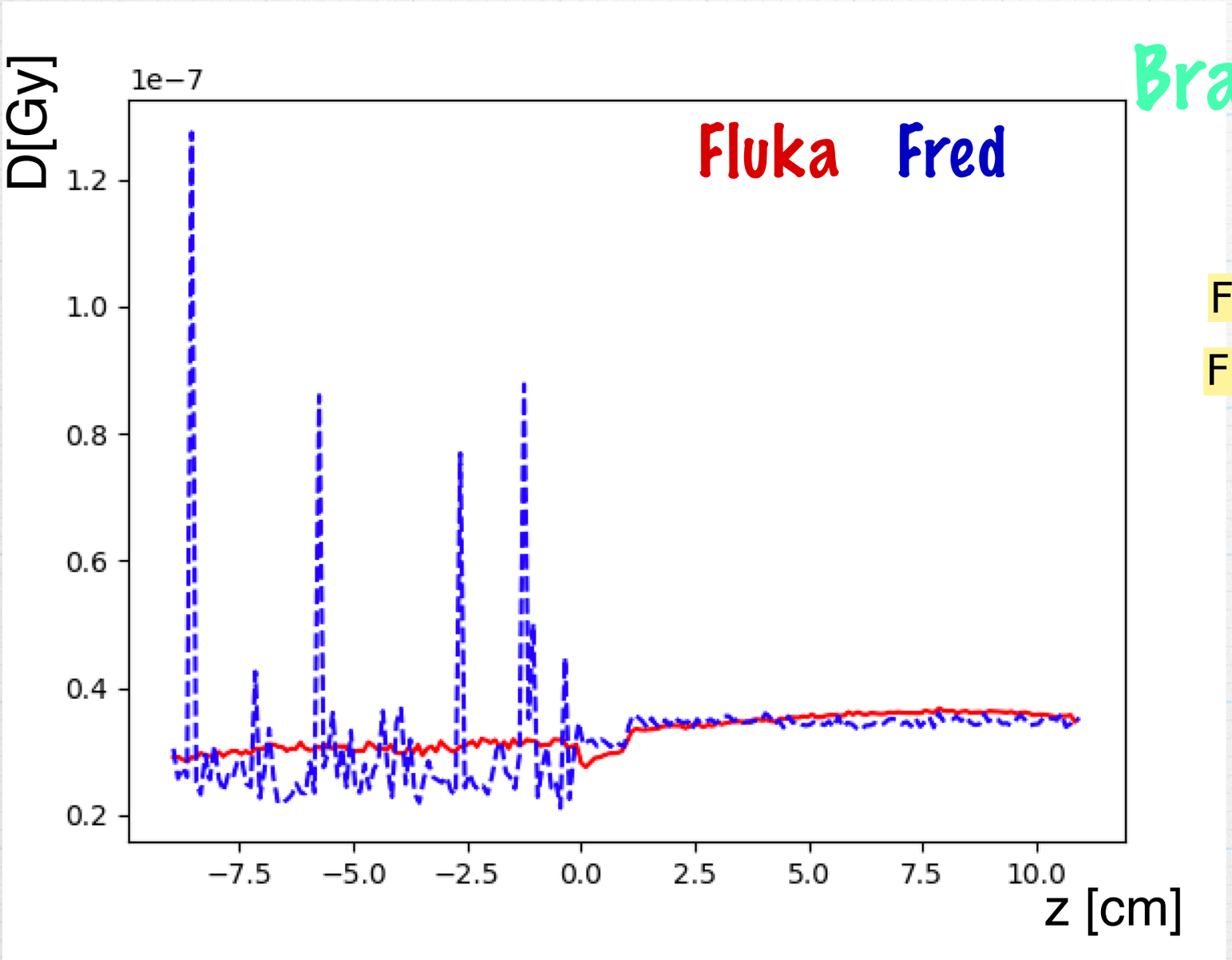
AirBoneBrain

Air

Bone

Brain



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FRED->sum= 6.42e-06 Gy/electron
FLUKA->sum= 6.57e-06 Gy/electron
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