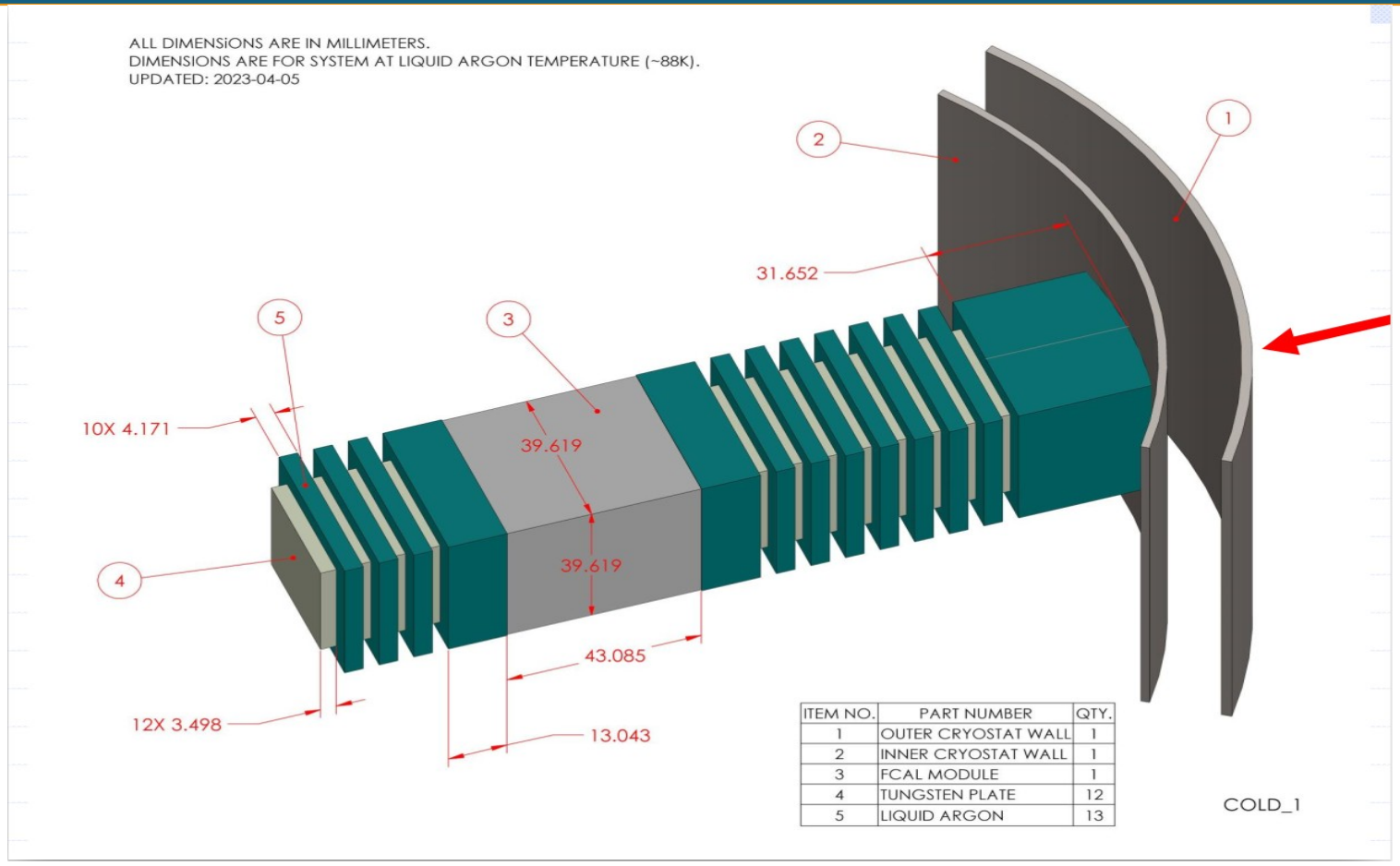
FCalPulse testbeam simulation

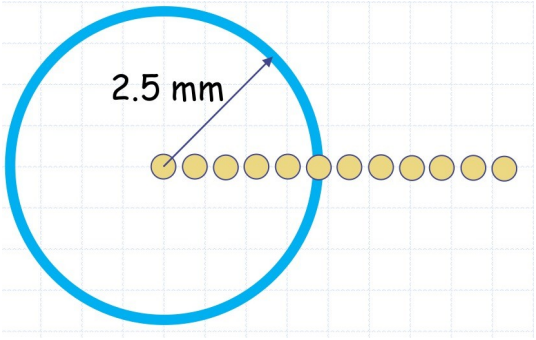
Munira Manashova (INP-Kazakhstan & JINR-Dubna)

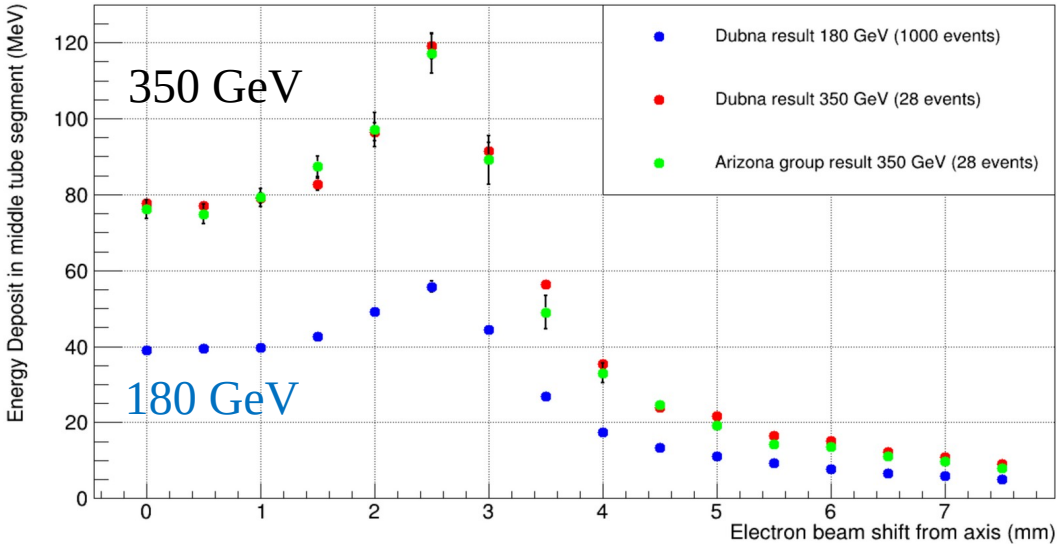
Outlook: **new (corrected) results and homework**

LAr GEANT4 geometry for 180 GeV test beam

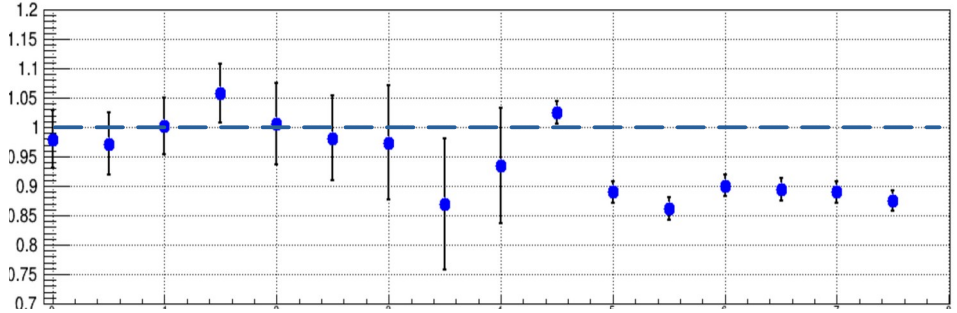


Reference points

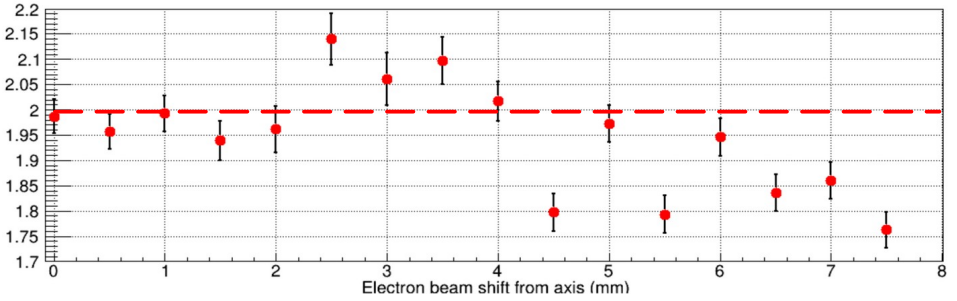




Arizona/Dubna ratio for 350 GeV

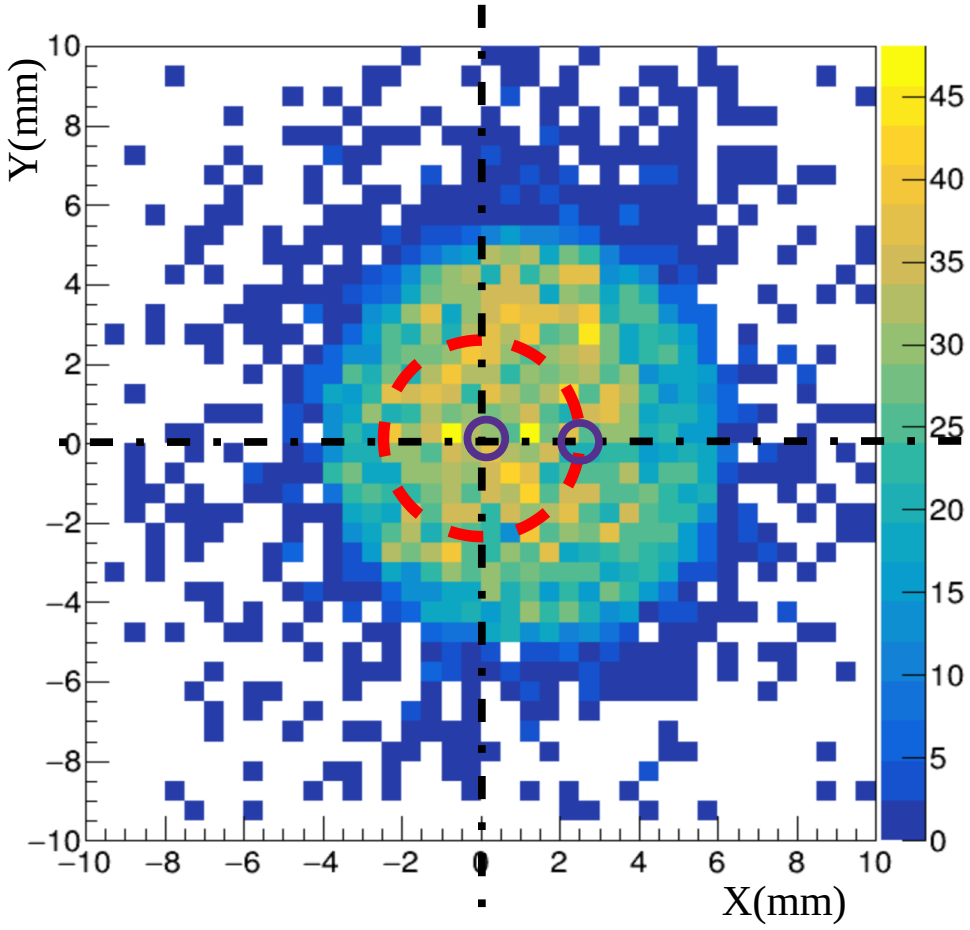


350GeV/180GeV ratio linearity

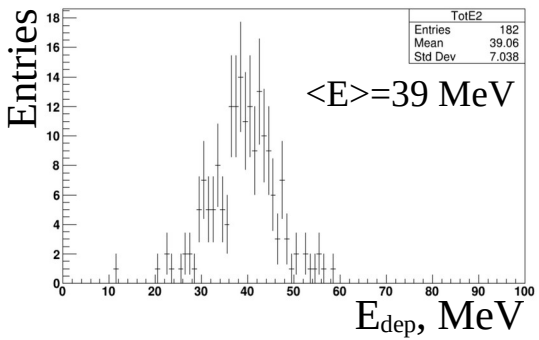


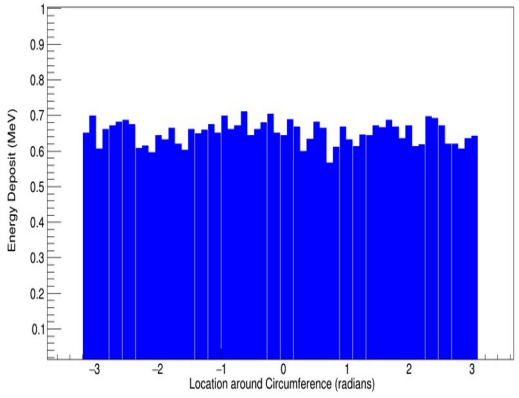
- We reproduced Arizona results for 350 GeV
- 1000 electrons were simulated for 180 GeV
- New results are in agreement with expectations

Deposited energy for two ref. points at X = 0 and X = 2.5 mm

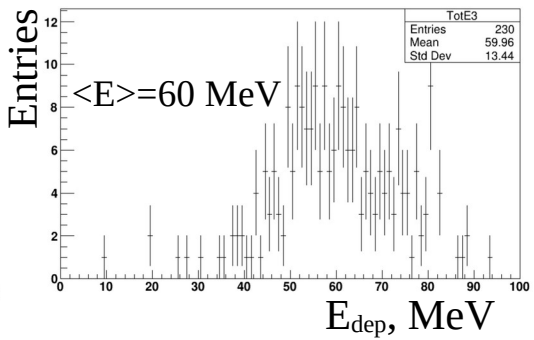


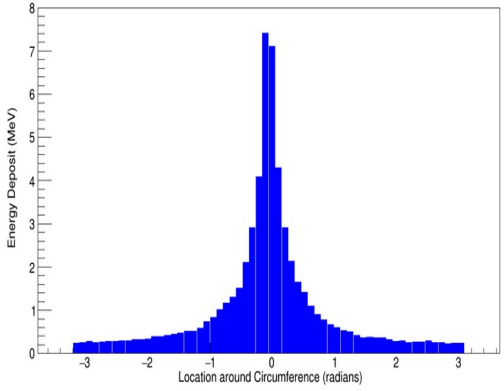
Offset 0 mm





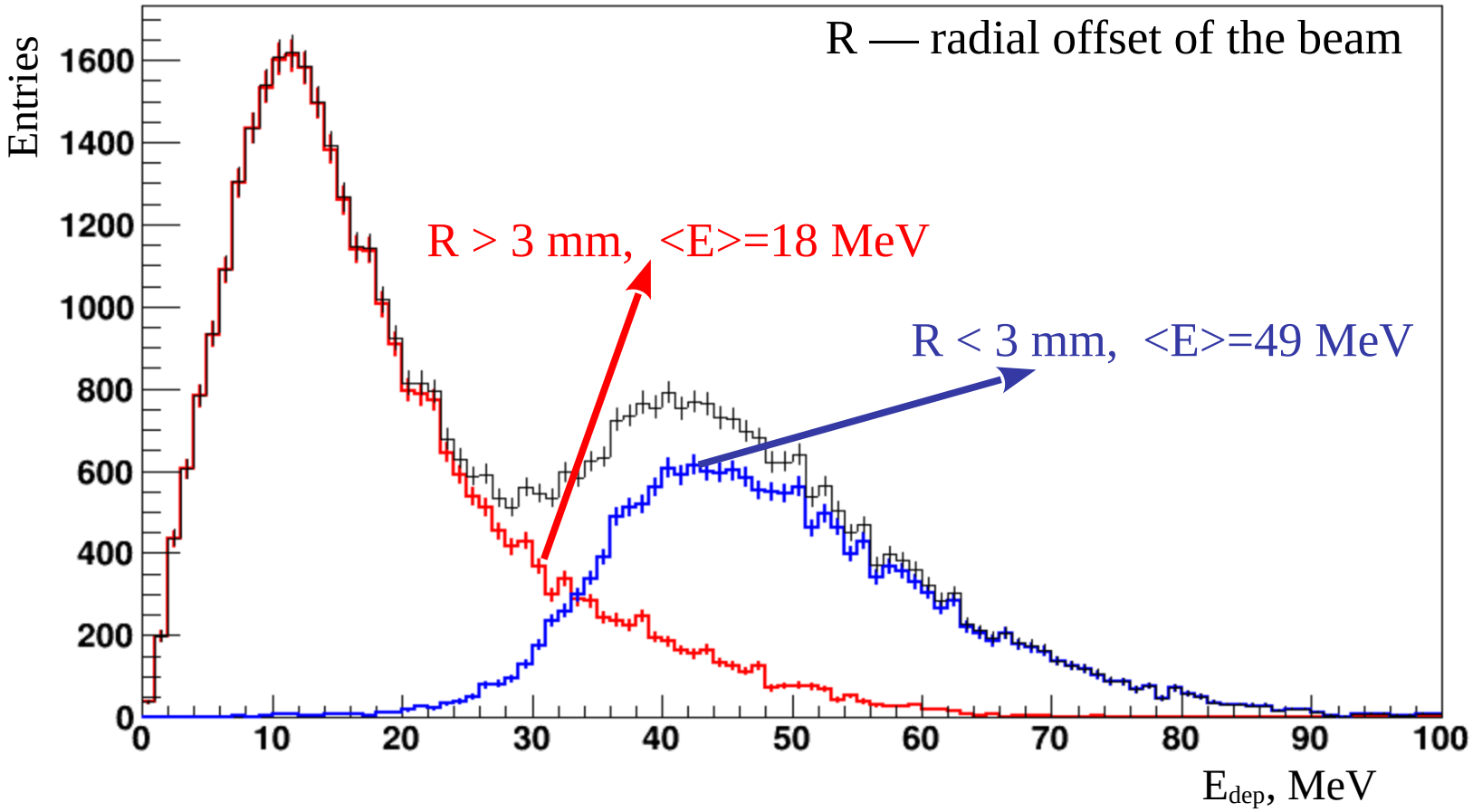
Offset 2.5 mm





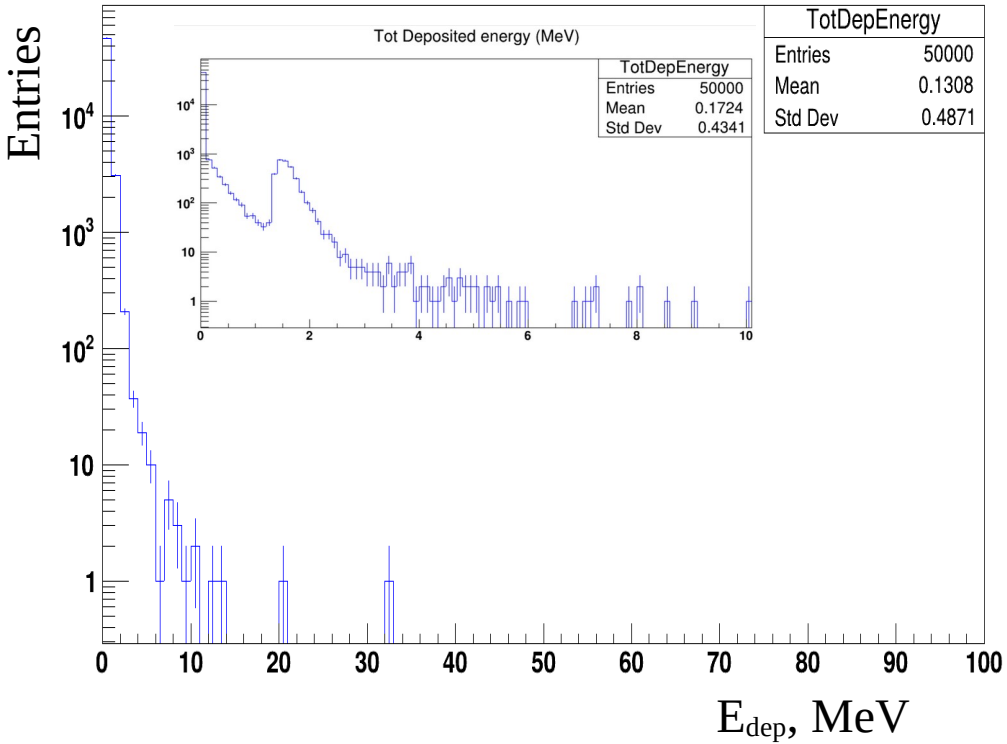
- Good agreement with expectations, both for E_{dep} and φ-profile

Total deposited energy for 180 GeV (no Sr-source)

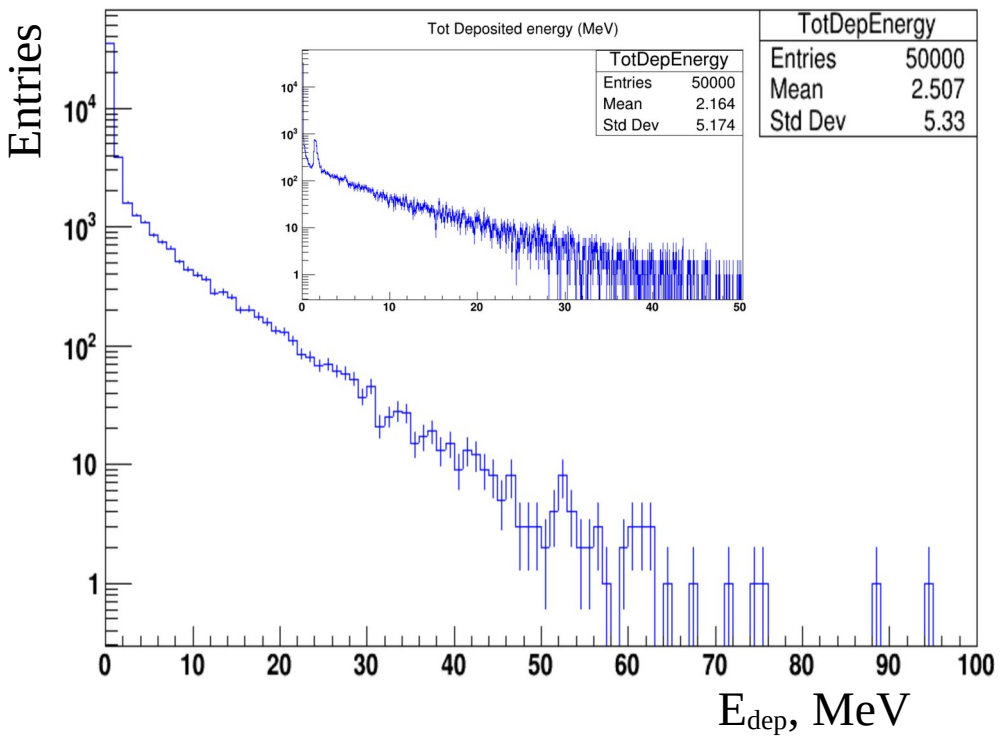


Total deposited energy for 180 GeV μ and π (no Sr-source)

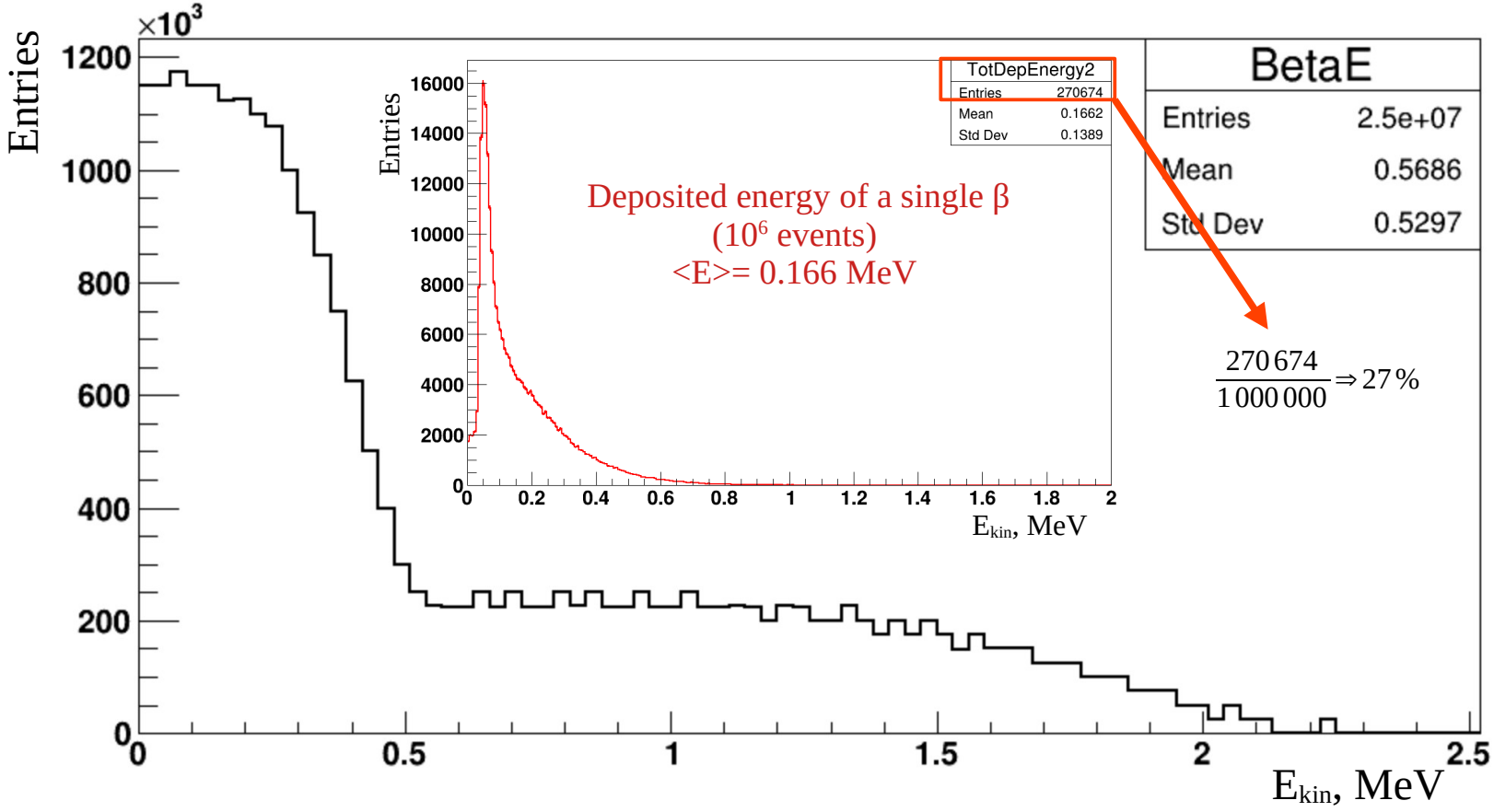
μ-beam



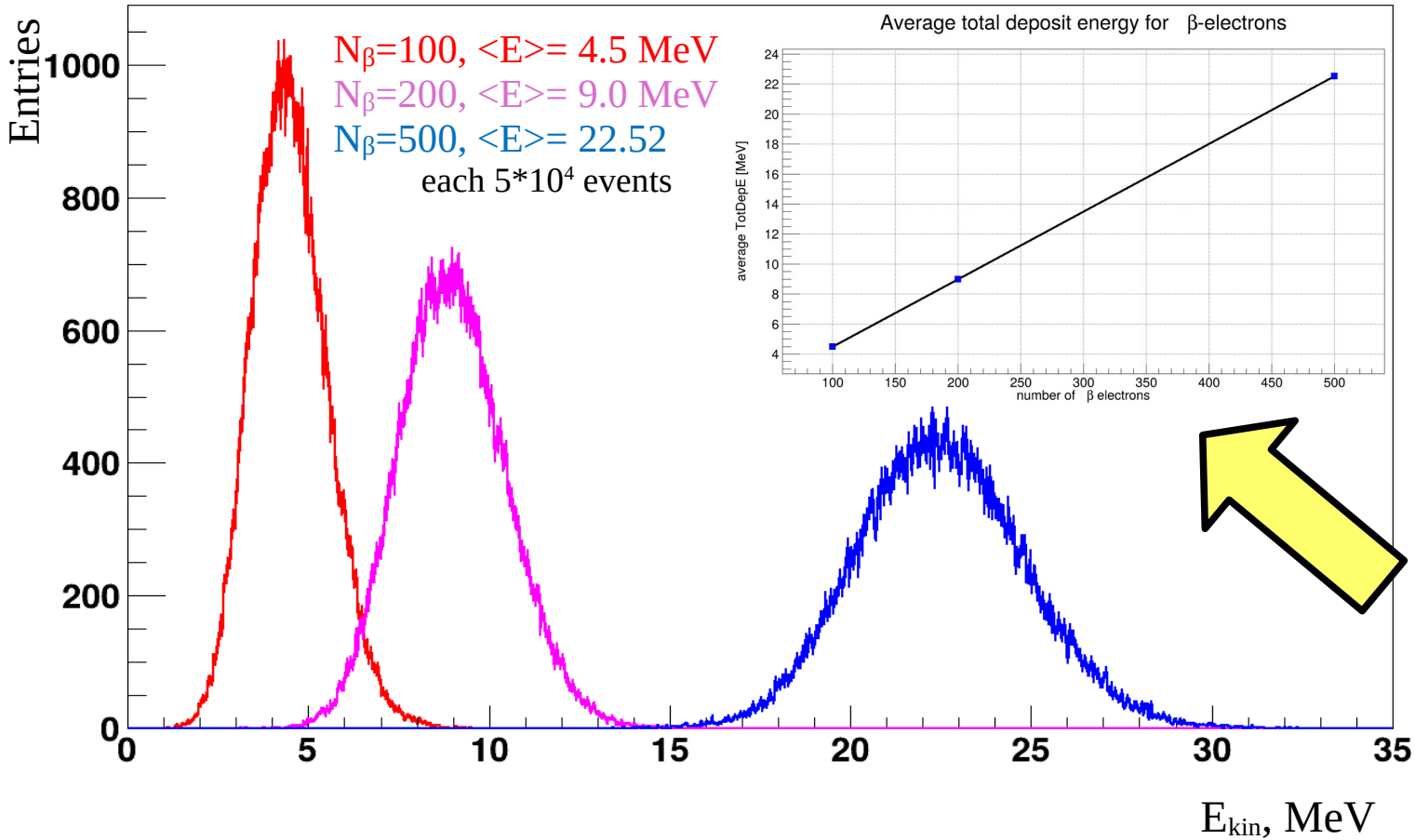
π-beam



Kinetic energy of β - electrons from Sr-90



Total E_{kin} for N_β = 100, 200 and 500 (No beam)



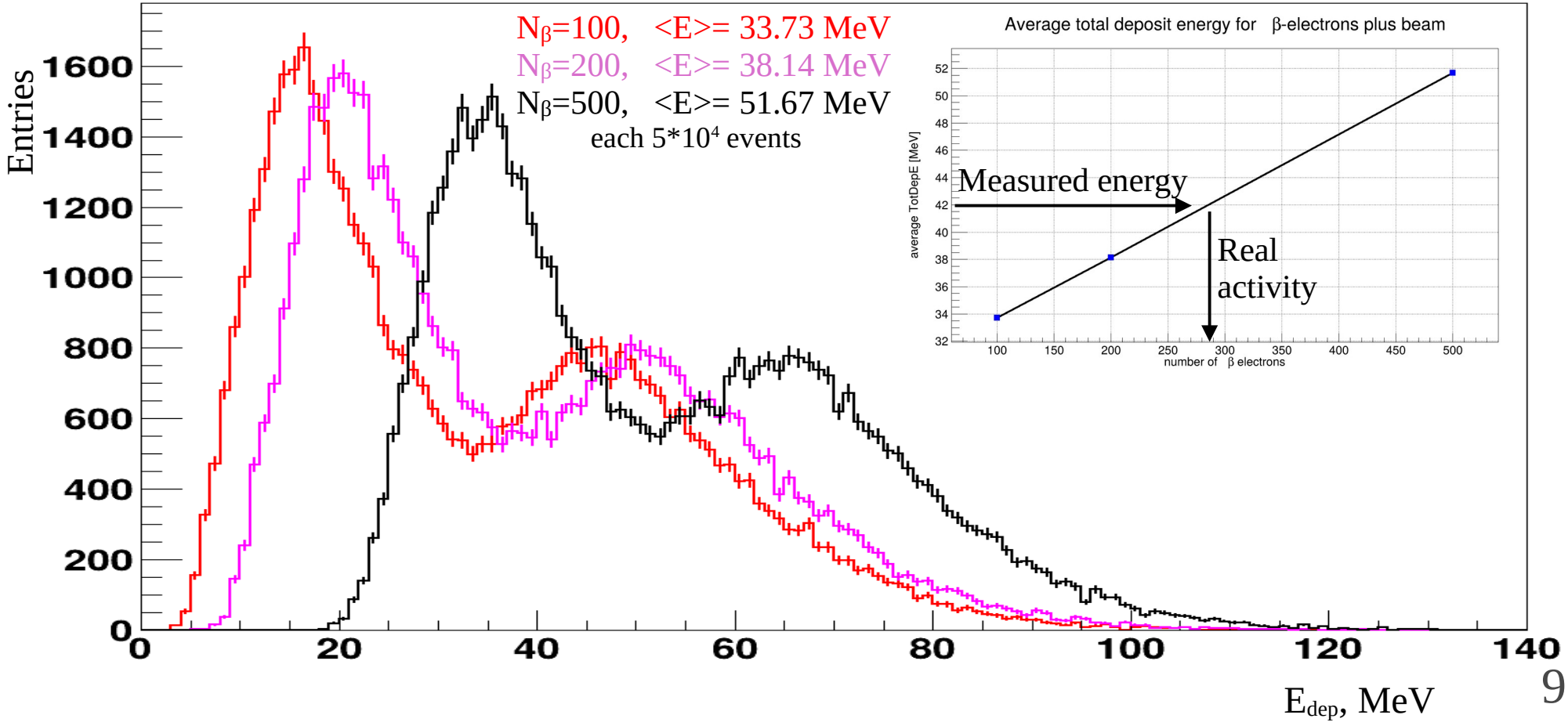
How many β's do we need?

1 Ci = $3.7 \cdot 10^{10}$ s^{-1}
100 mCi = $3.7 \cdot 10^{9}$ s^{-1}
$4\pi \rightarrow 2\pi \rightarrow$ ~ $2 \cdot 10^{9}$ s^{-1}
pulse duration in FCal is ~ 50 ns (LAr TDR)

We need ~ 100 β's for every e^-

Actual value of the source activity we could estimate by comparing experimental data and simulation for different N_β

Total deposited energy of the beam(180GeV) plus β-electrons



Conclusion

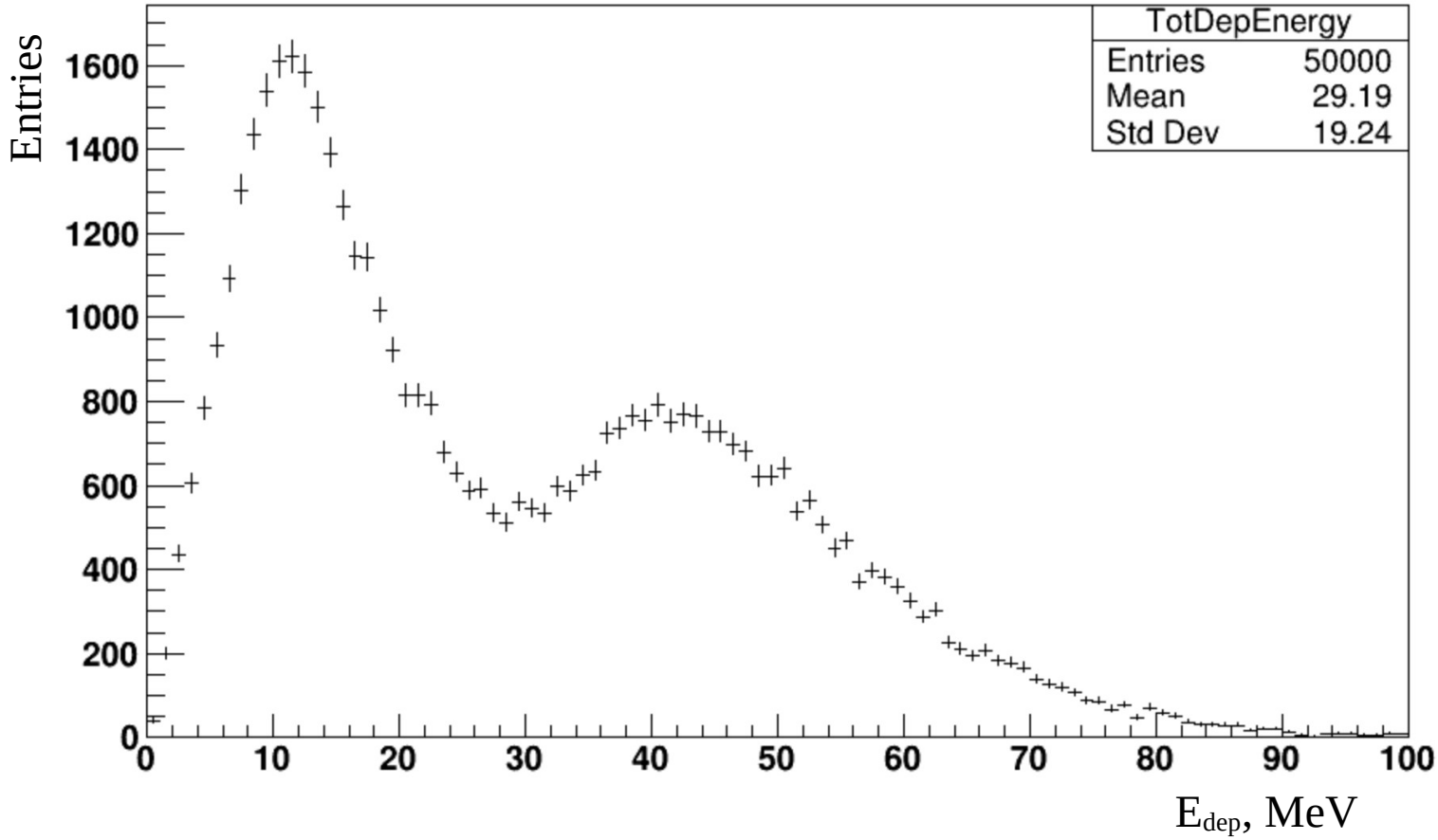
- Finally, we obtained deposited energy distributions for the test-beam setup with and without beta-source

- Sven's homework is done, but needs to be digested

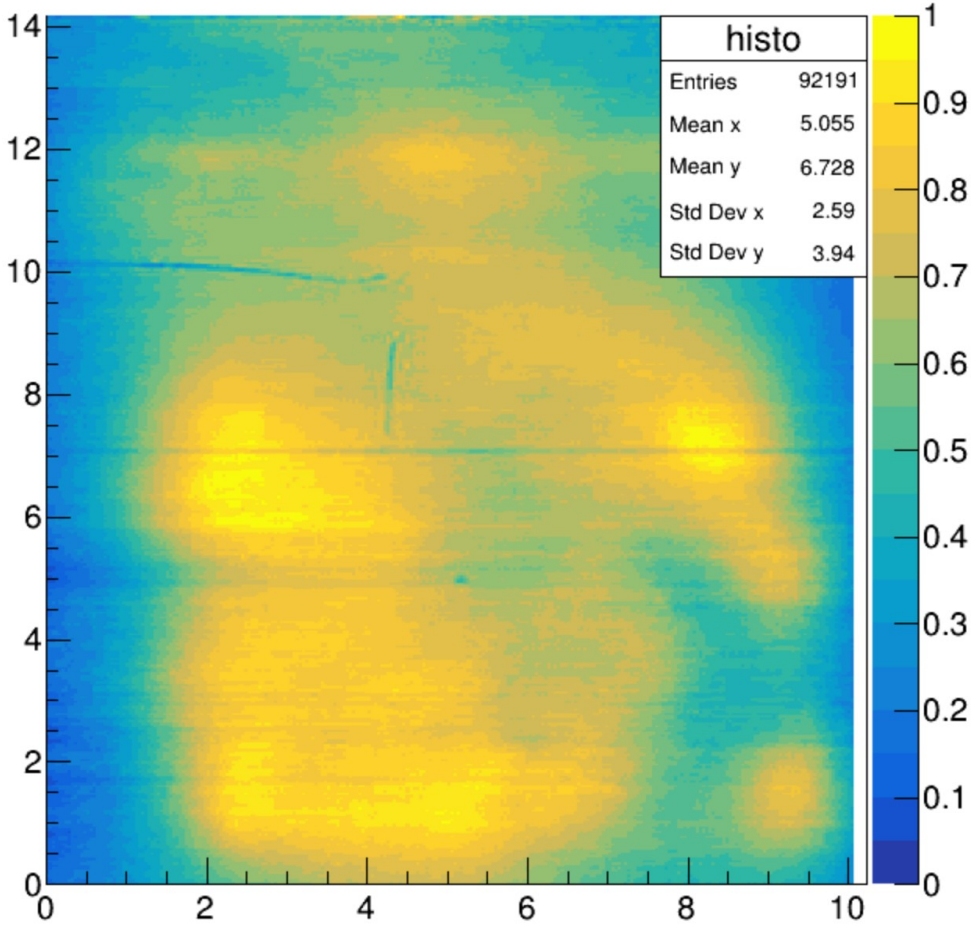
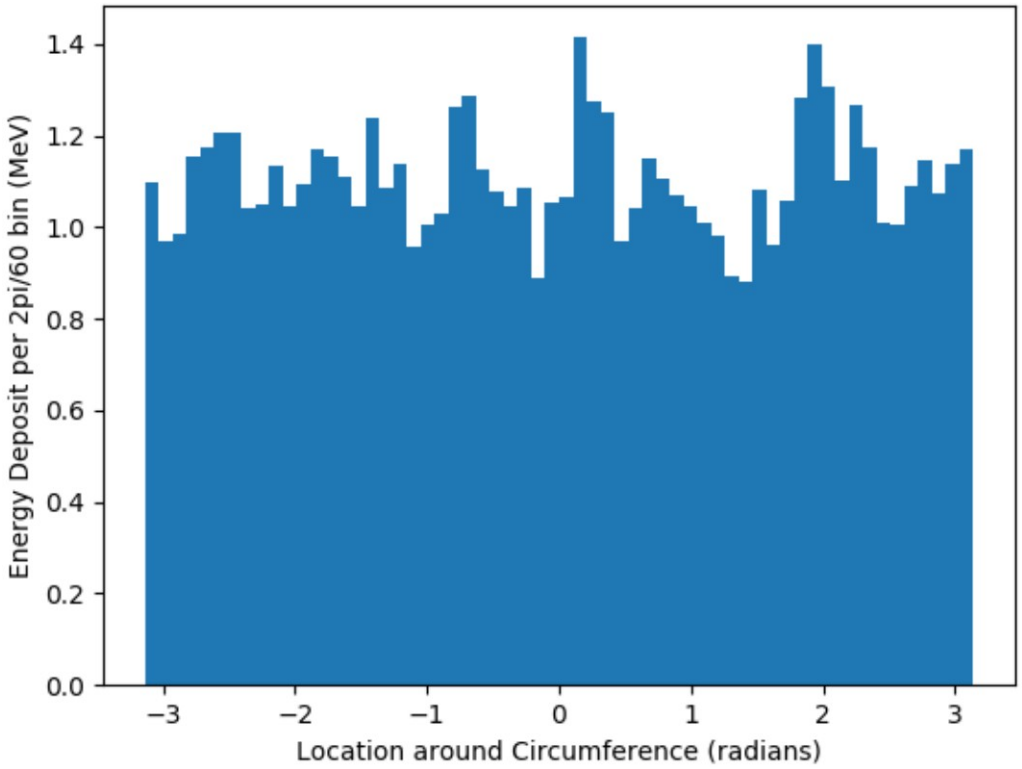
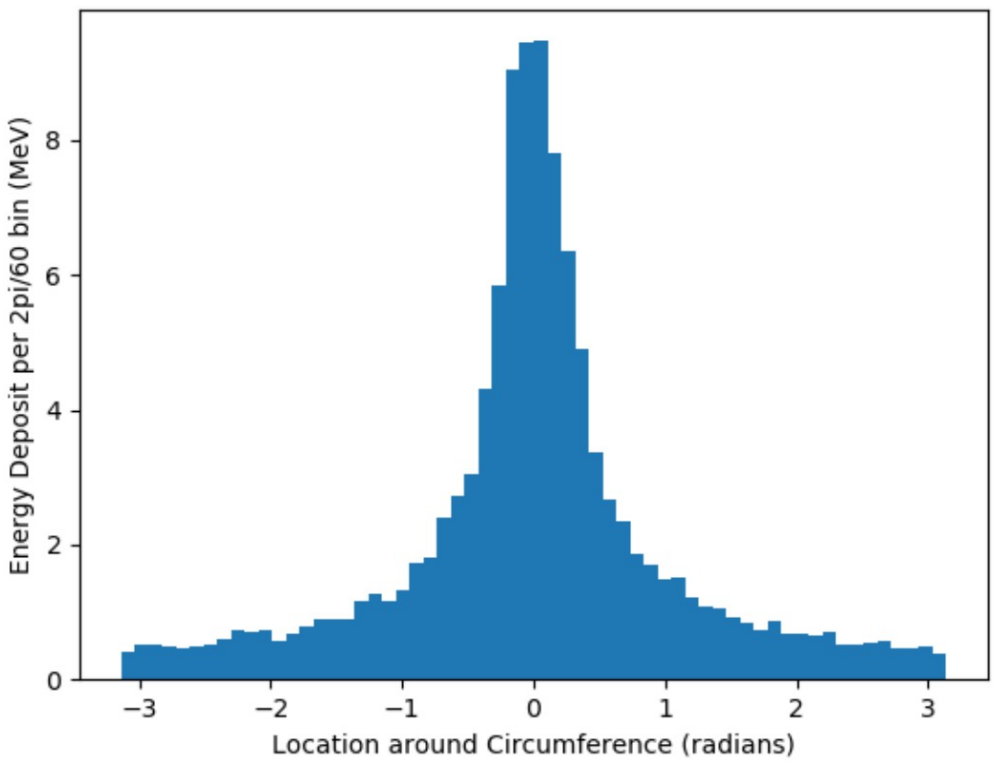
- For further progress we need to decide on:
  - the actual geometry (beam spot size R)
  - number of beta-electrons (a range of?)
  - plots ?

Back up

Total deposited energy for 180 GeV (no Sr-source)



digital foil



Arizona group results to 0 and 2.5 mm offset