

MC simulations of proton beam spread

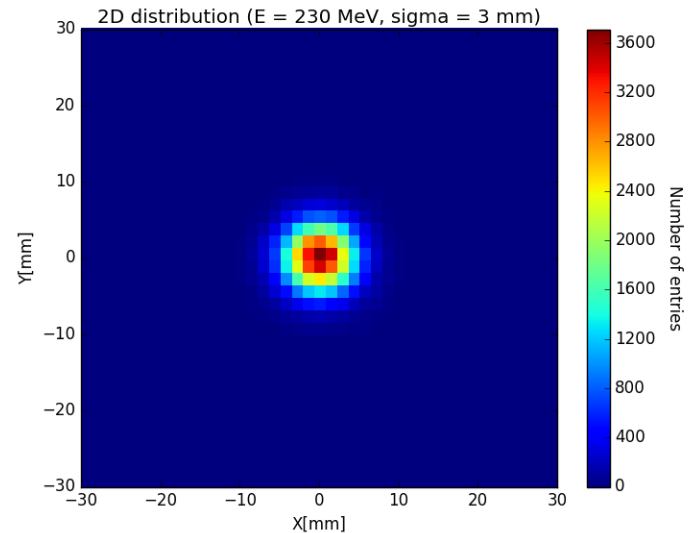
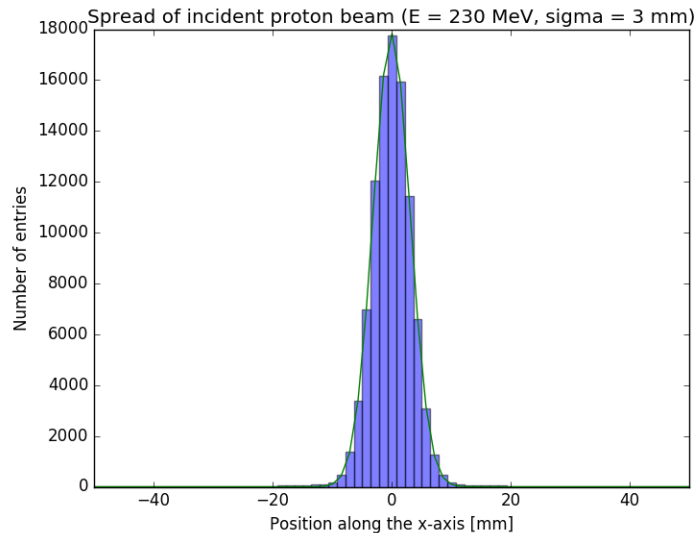
09.03.2017

pCT – group meeting

Ilker Meric – WP 1

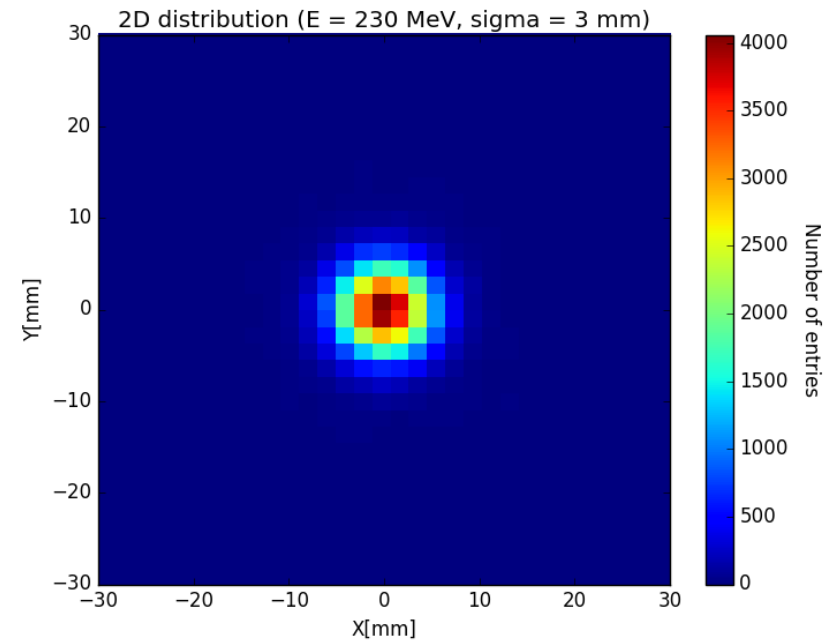
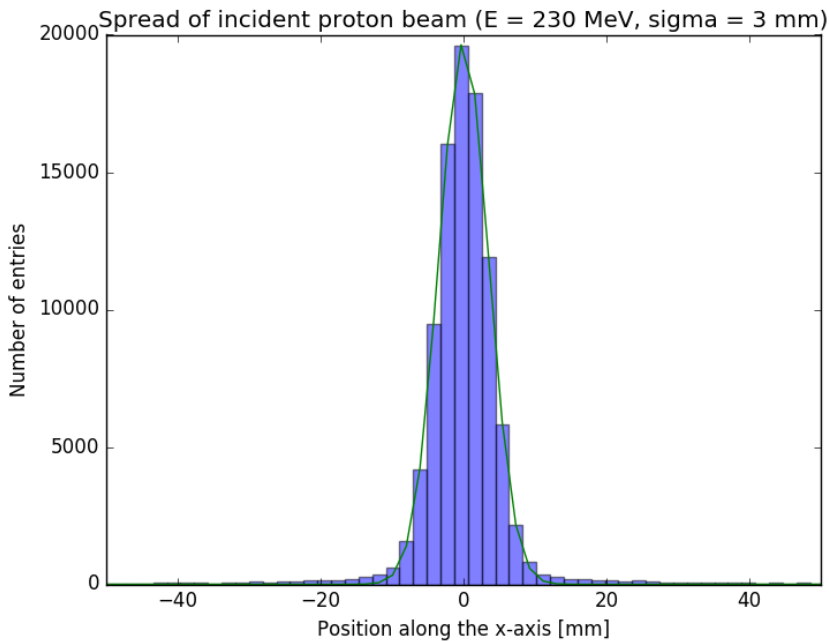
MC simulation setup

- Monoenergetic proton pencil beam ($E=230$ MeV)
- 10^5 primary protons for each run
- A Gaussian spatial distribution ($\sigma = 3.0$ mm)



Some results from MC simulations

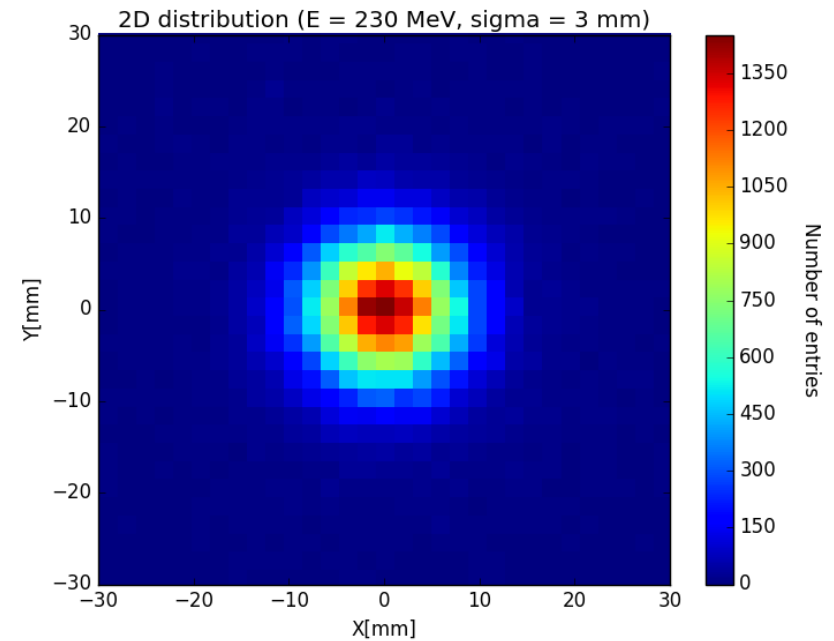
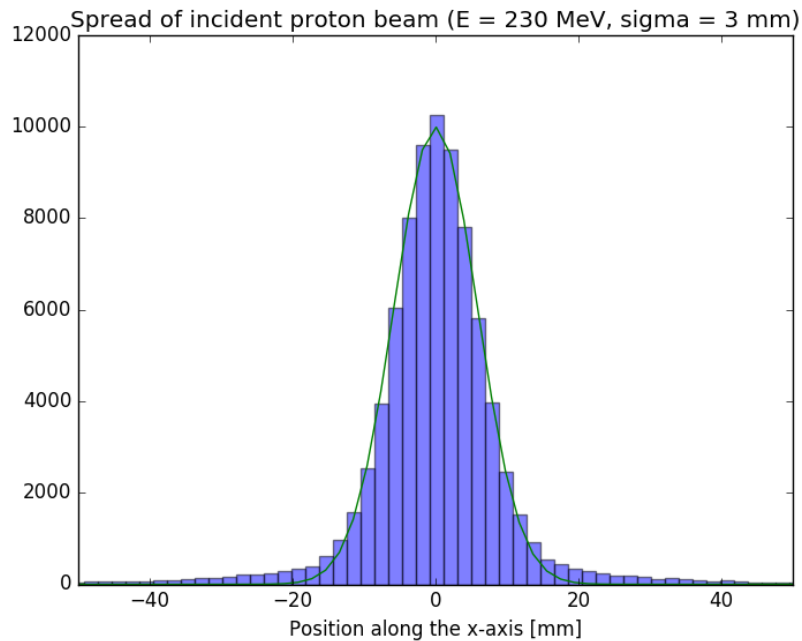
- After traversing 120 mm water



- 2D distribution → profile of the beam incident on the first layer
- Predicted $\sigma \approx 3.5$ mm

Some results from MC simulations

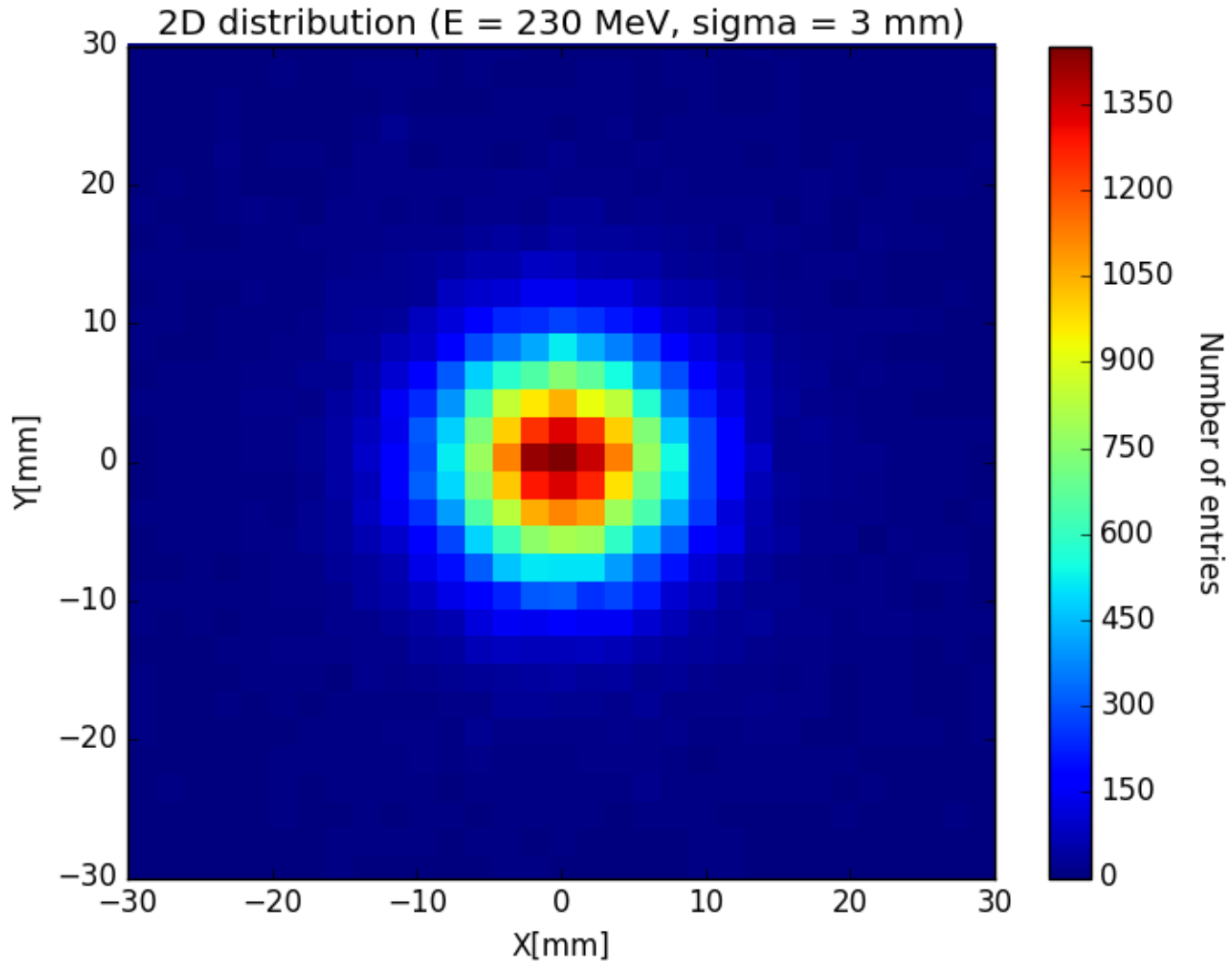
- After traversing 250 mm water



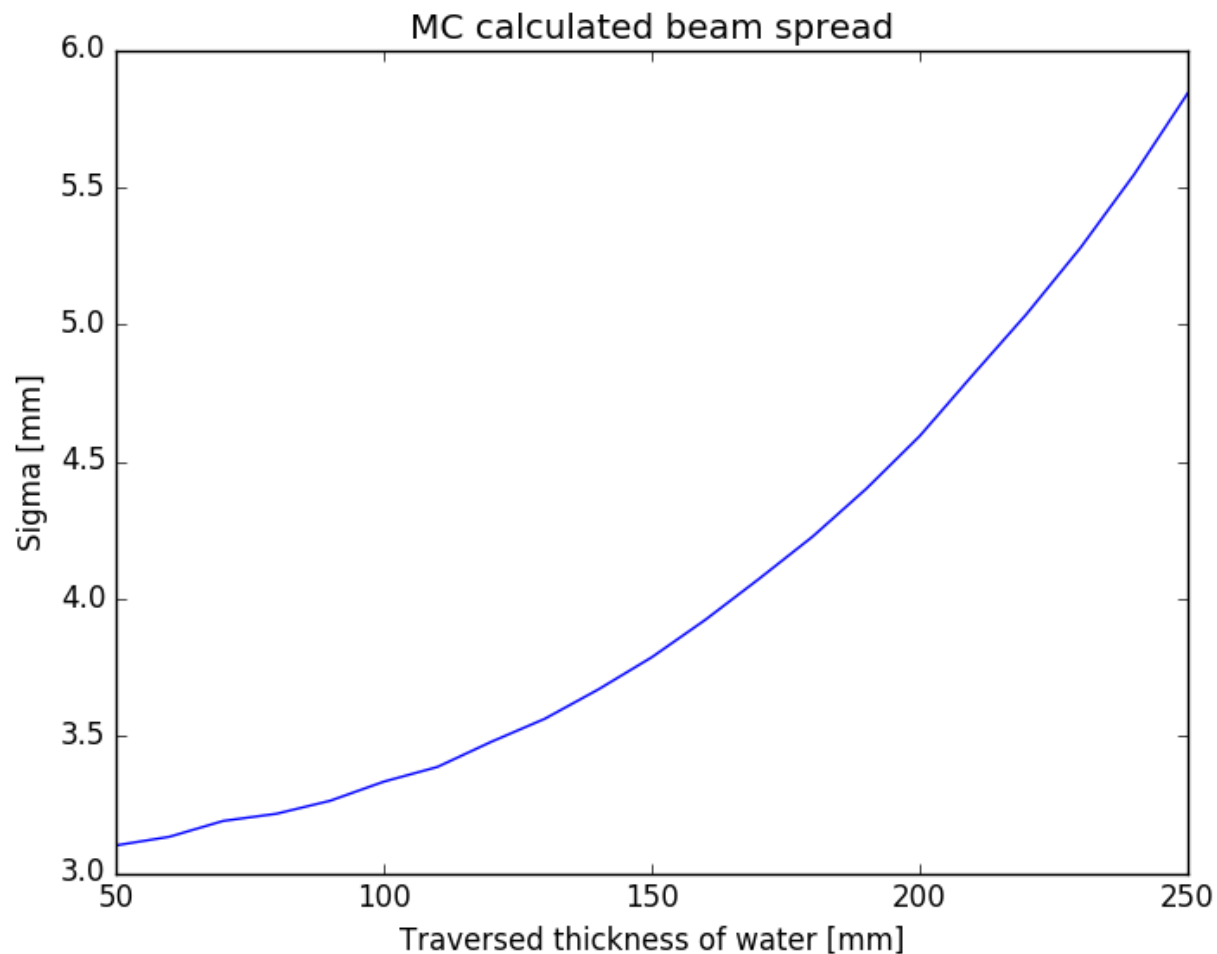
- 2D distribution → profile of the beam incident on the first layer
- Predicted $\sigma \approx 5.8$ mm

Proton beam spread

- From 50 mm to 250 mm in steps of 50 mm

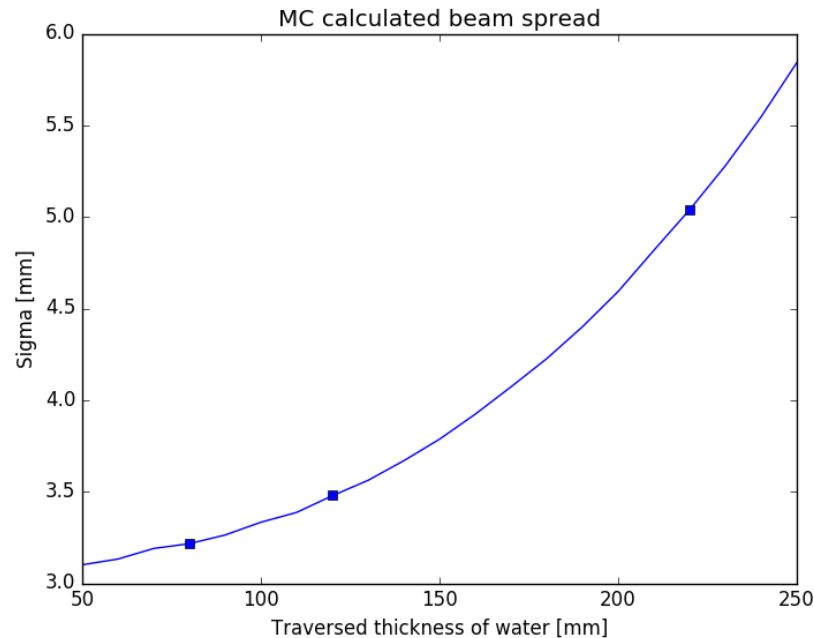


Over the full range (50 – 250 mm)



Proton beam spread

- We should be fine when using small diameter phantoms
- Heterogeneities (here 3 x 3 mm² B-100, bone eqv. plastic)?



- Need reconstructed images to assess the resolution loss due to ignoring the proximal trackers