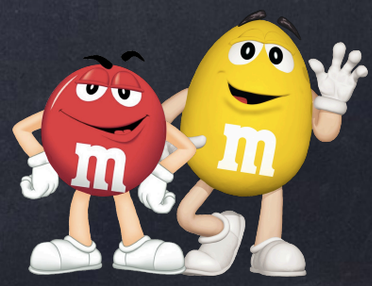
Fred Plugin for Tracking and Backtracking

ARPG meeting 01/03/2018

Micol & Marta

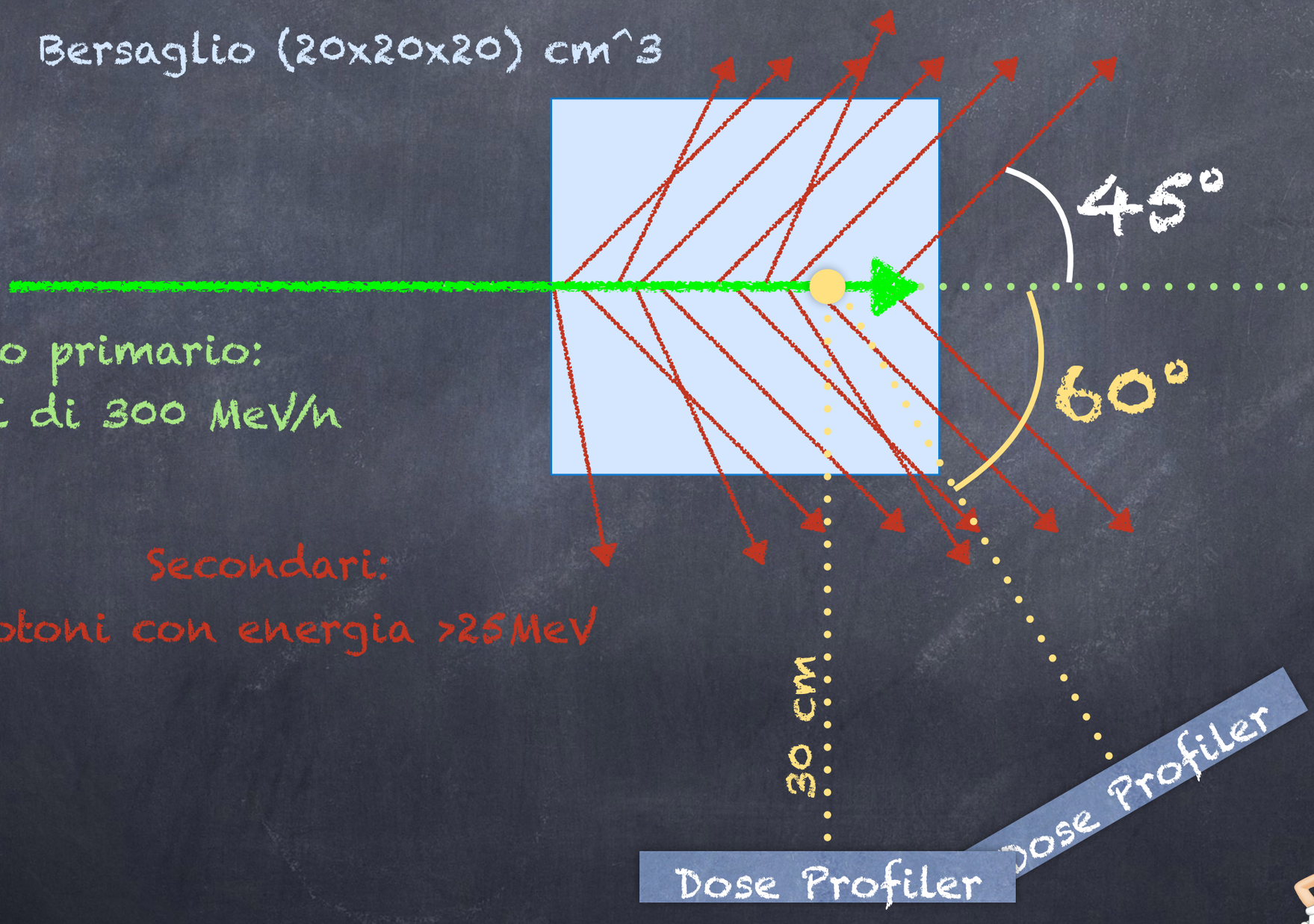


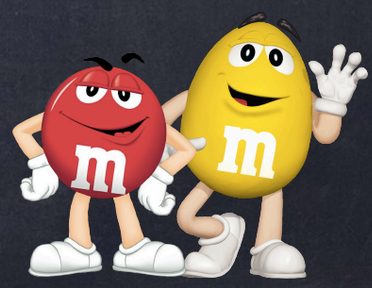
Tracking and Backtracking

Bersaglio (20x20x20) cm^3

Fascio primario:
2x10^6 C di 300 MeV/n

Secondari:
Protoni con energia >25MeV



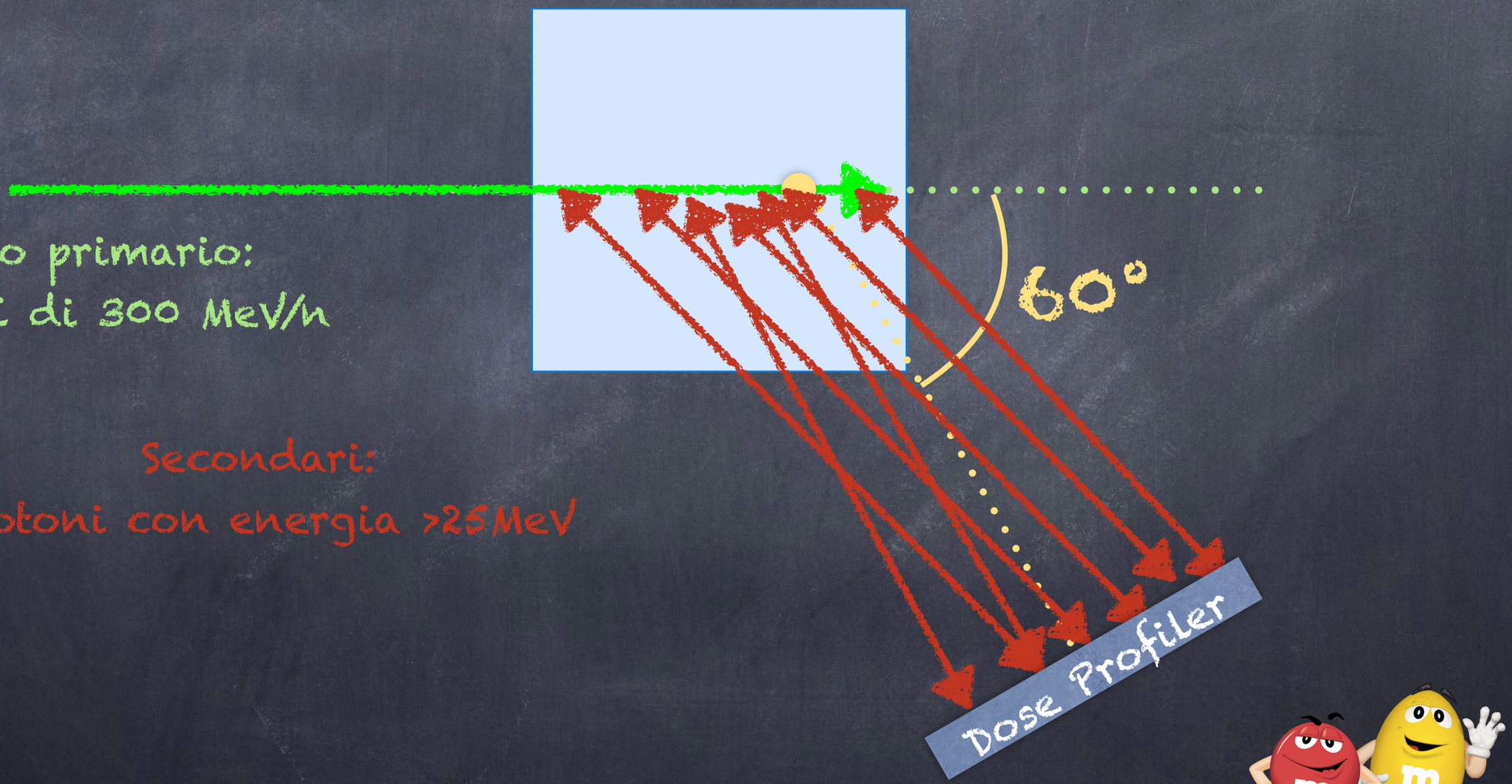


Tracking and Backtracking

Bersaglio (20x20x20) cm^3

Fascio primario:
2x10^6 C di 300 MeV/n

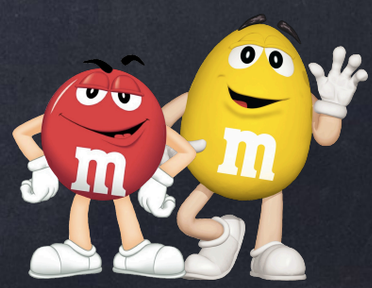
Secondari:
Protoni con energia >25MeV



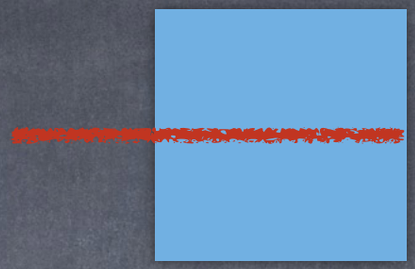
Tracking and Backtracking

- Targets: H2O, H2O+bone, CT
- Dose Profiler: 60°, 90°

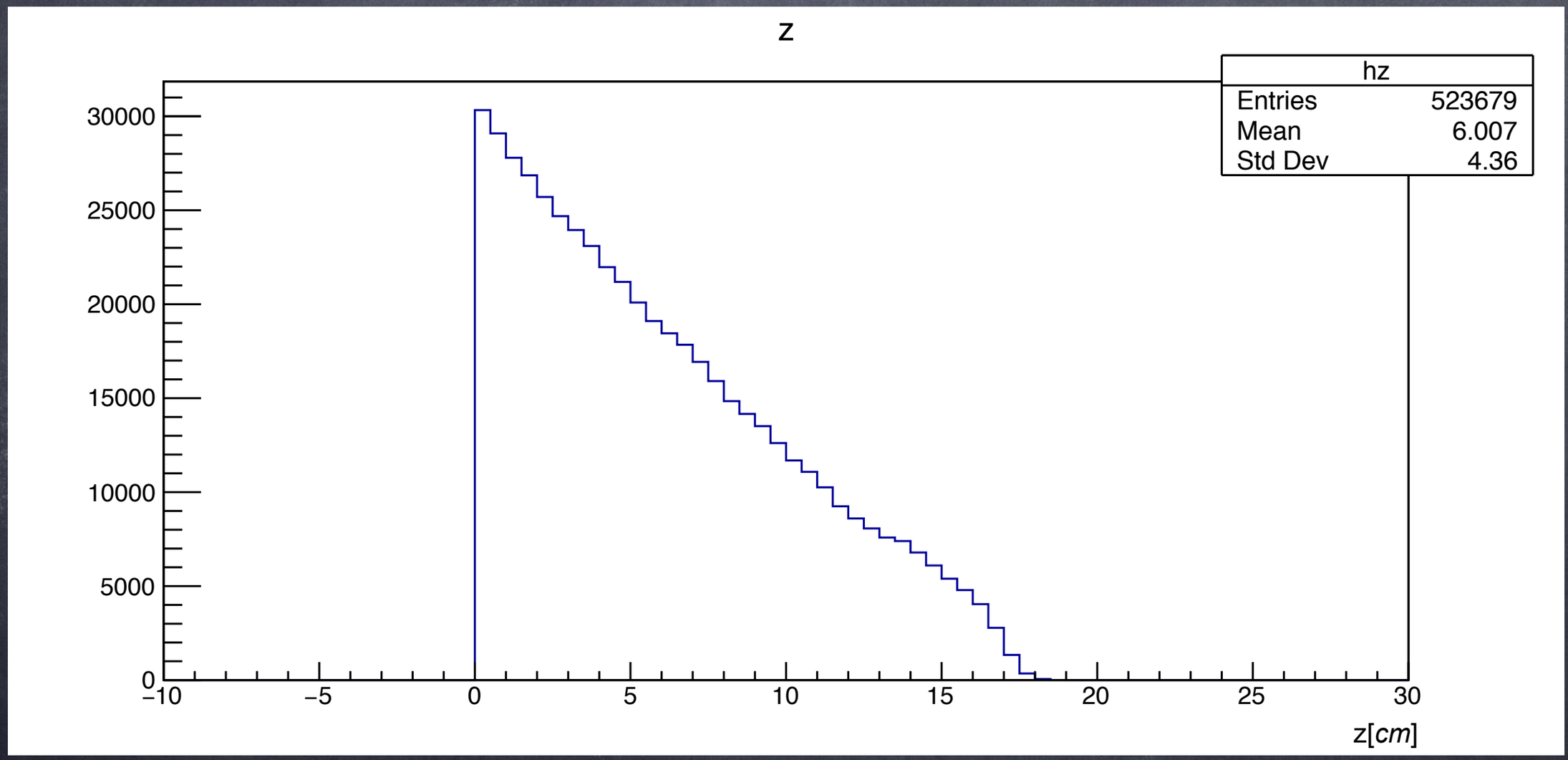
- Emission profile of secondary
- Range (zp)
- Minimum approach distance

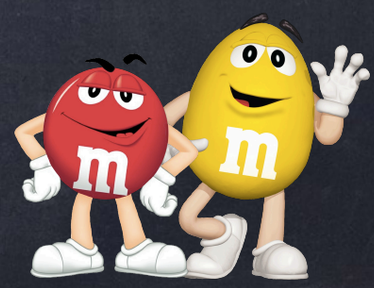


Target: H2O
Initial Position

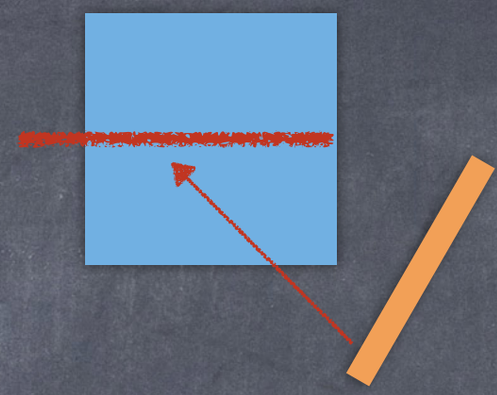


TARGET:
(20x20x20) *cm^3*
Z/A = 0.55595
ρ = 1 *g/cm^3*





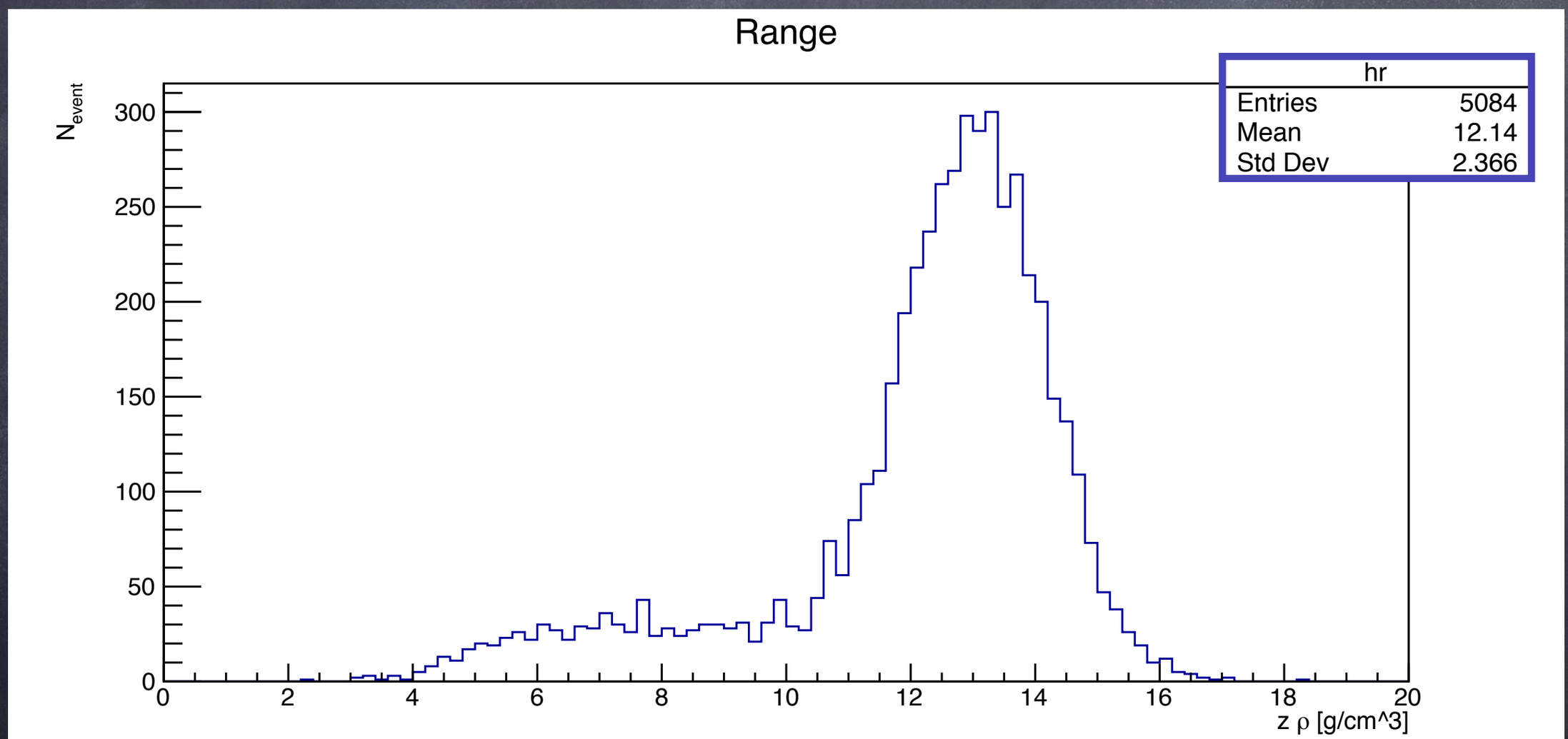
DP at 60°, Target: H2O
Range (Backtracking)



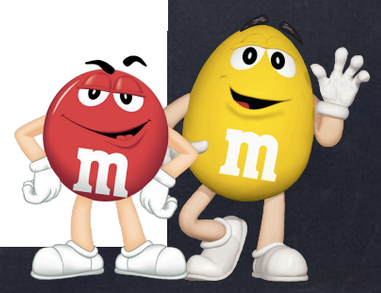
TARGET:
(20x20x20) *cm^3*
ρ = 1 *g/cm^3*

DP:
(20x20)*cm^2*
Distanza: 30 *cm*

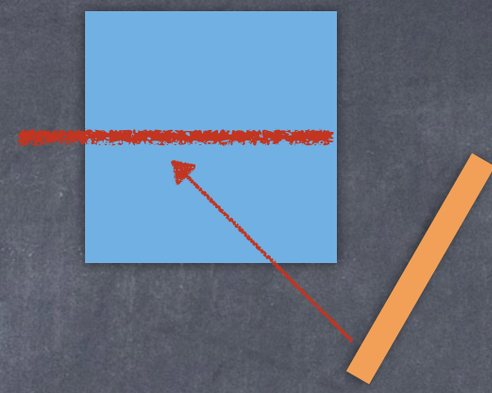
Isocentro:
(0, 0, 15) *cm*



Not considering nuclear interactions



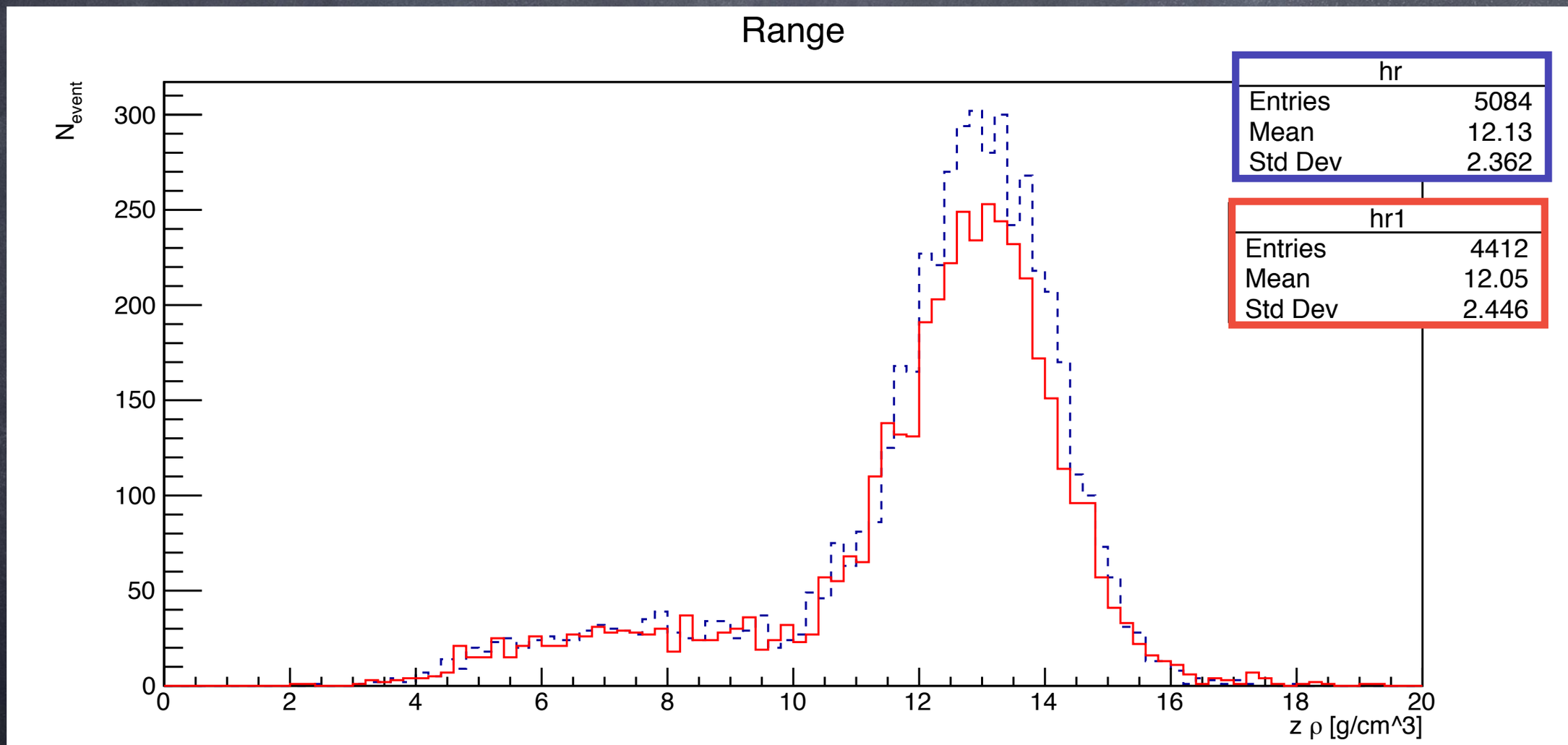
DP at 60°, Target: H2O
Range (Backtracking)



TARGET:
(20x20x20) *cm^3*
ρ = 1 *g/cm^3*

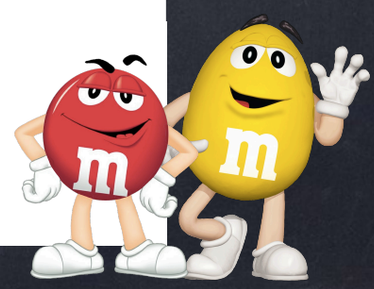
DP:
(20x20)*cm^2*
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*

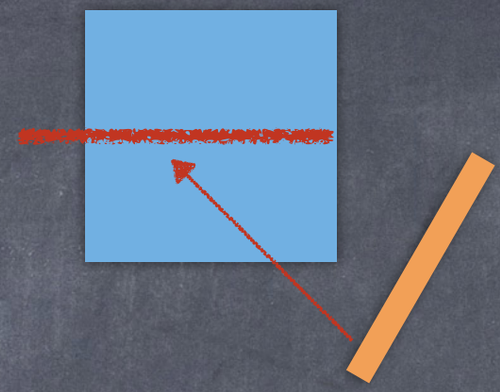


Not considering nuclear interactions

Considering nuclear interactions



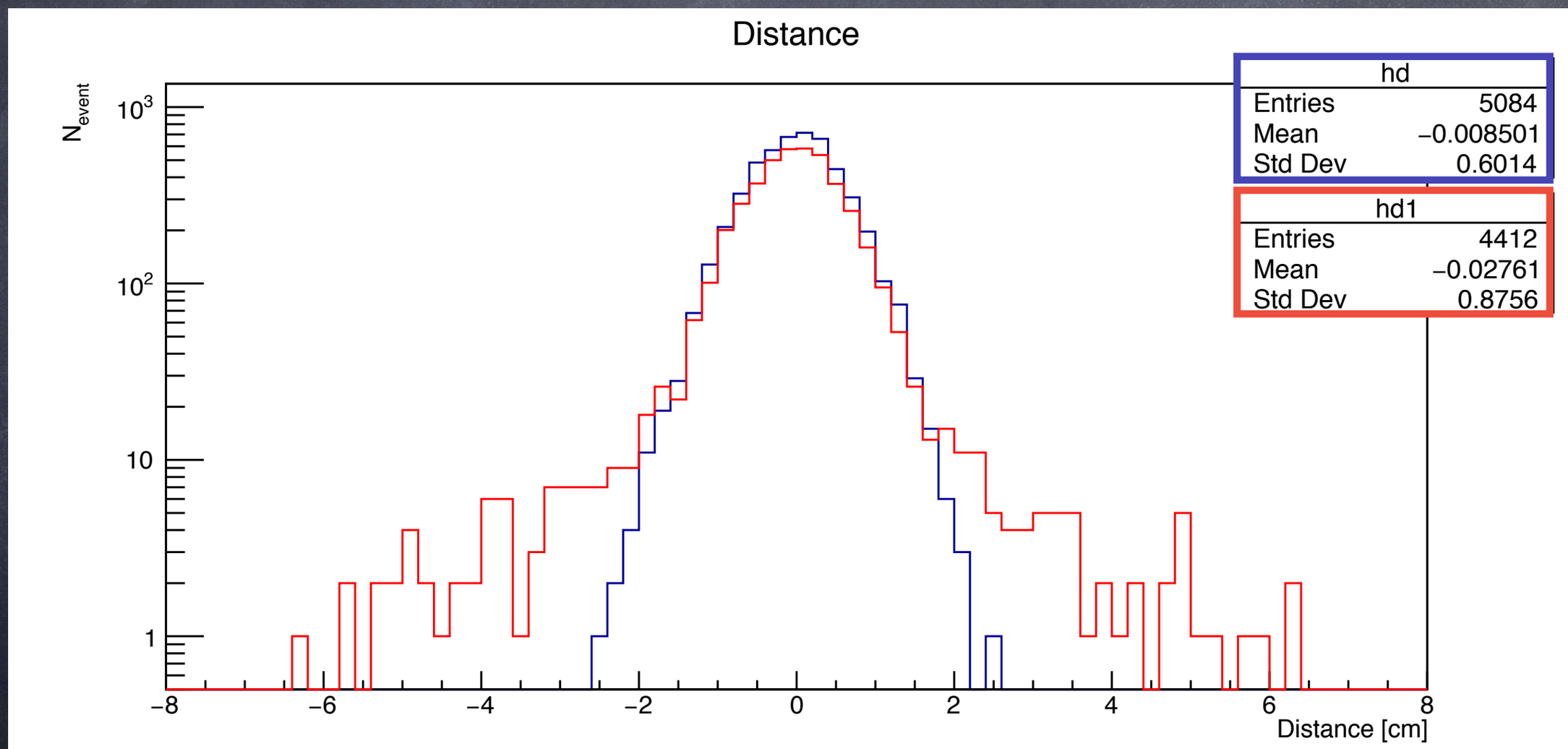
DP at 60°, Target: H2O
Minimum Approach Distance (Backtracking)



TARGET:
(20x20x20) *cm^3*
ρ = 1 *g/cm^3*

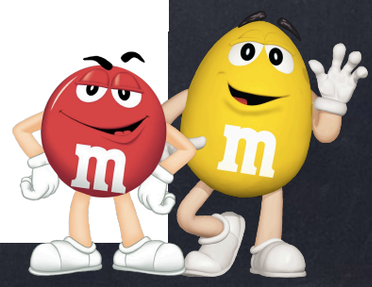
DP:
(20x20)*cm^2*
Distance: 30 *cm*

Isocentro:
(0, 0, 15) *cm*

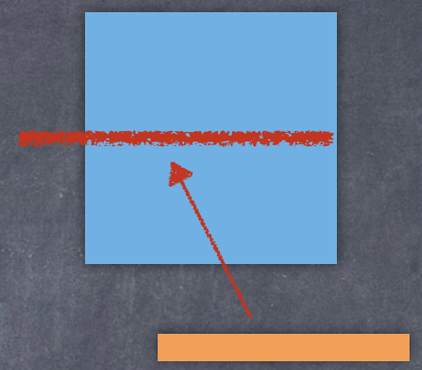


Not considering nuclear interactions

Considering nuclear interactions



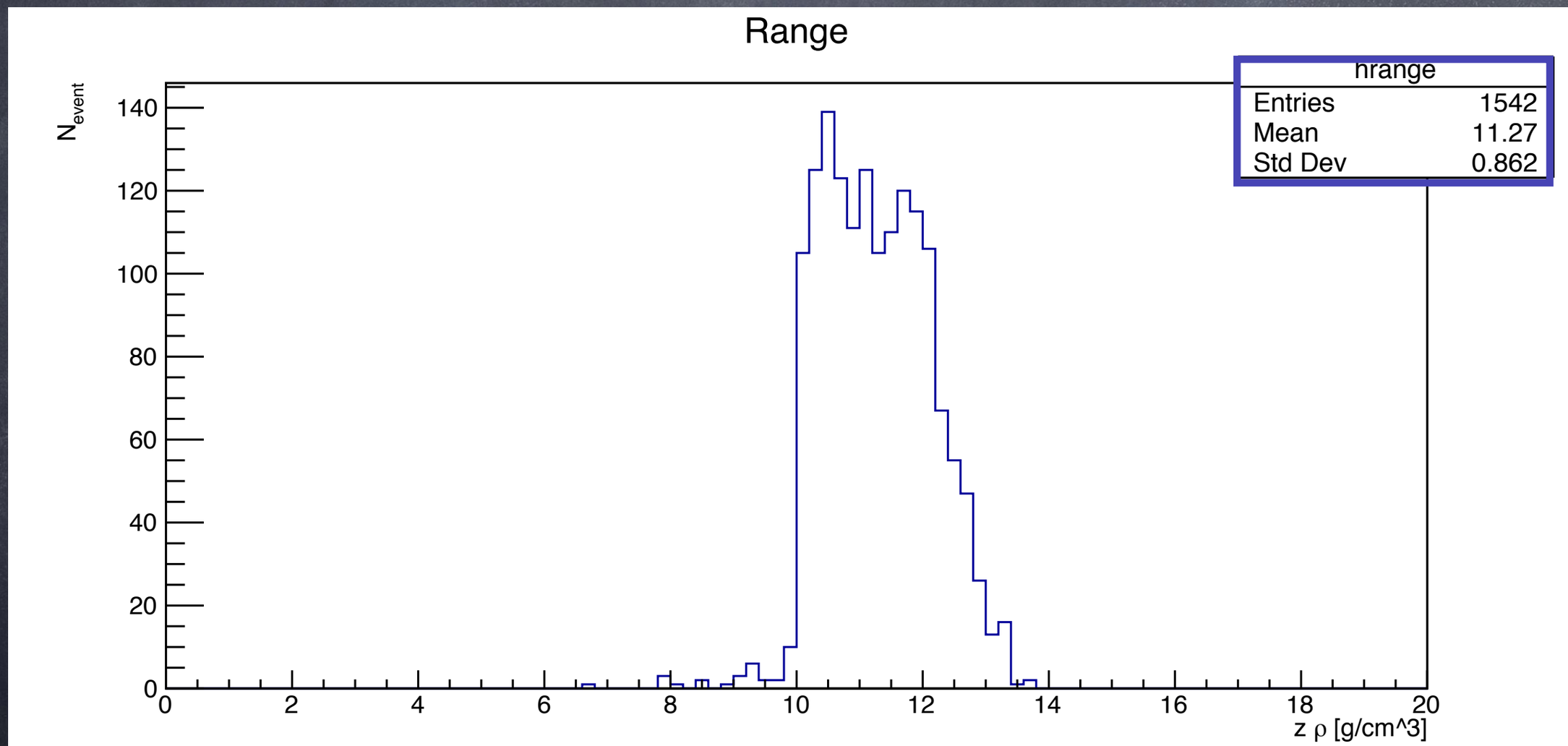
DP at 90°, Target: H2O
Range (Backtracking)



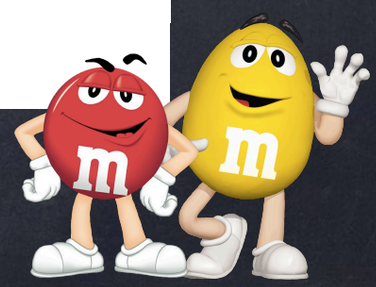
TARGET:
(20x20x20) *cm^3*
Z/A = 0.55595
ρ = 1 *g/cm^3*

DP:
(20x20)*cm^2*
Distanza: 30 *cm*

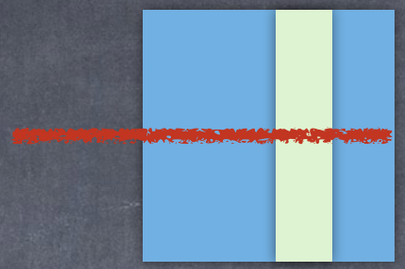
Isocentro:
(0, 0, 15) *cm*



Not considering nuclear interactions



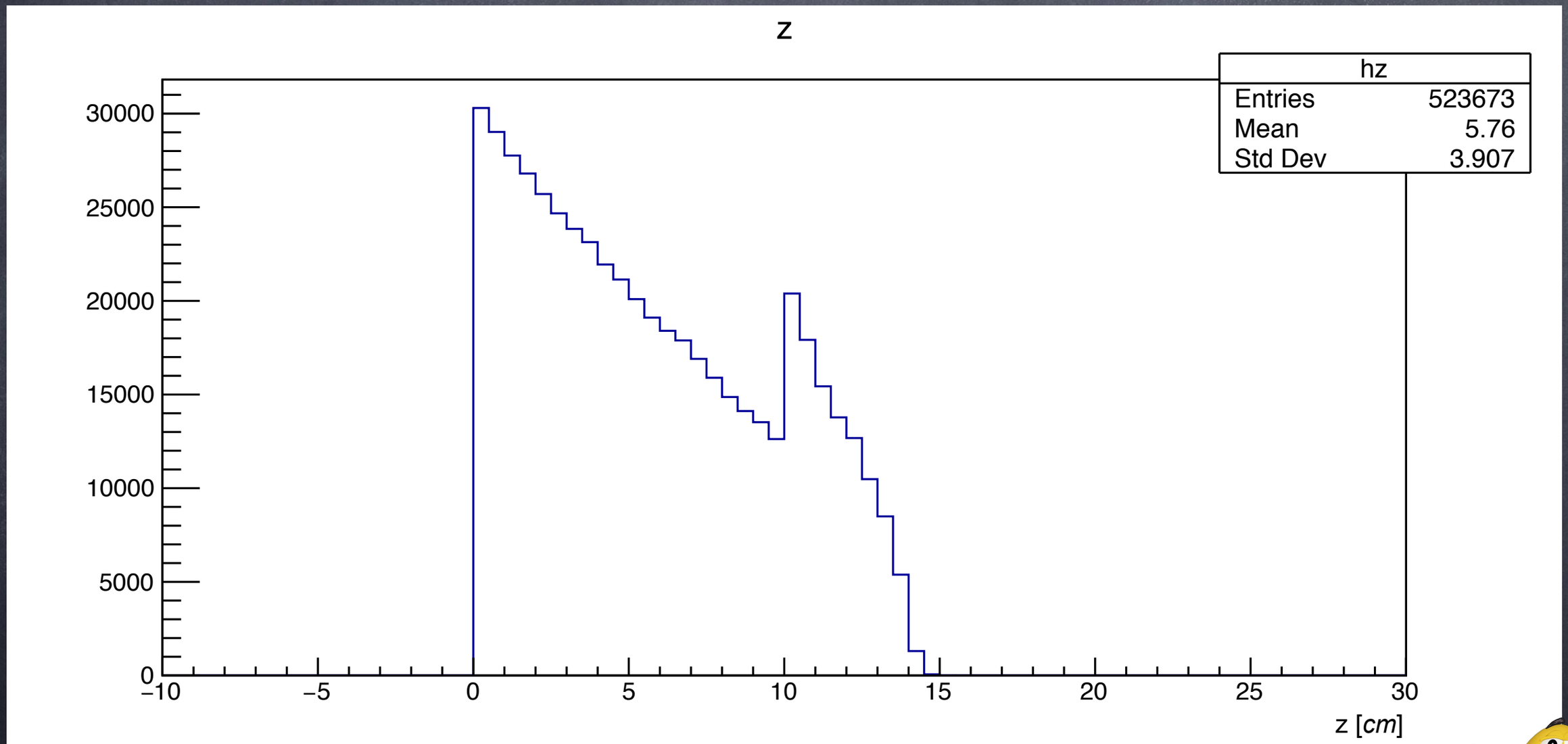
Target: H2O+Bone
Initial Position

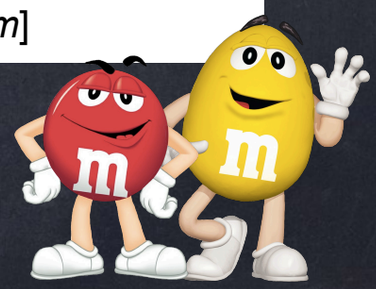


TARGET:

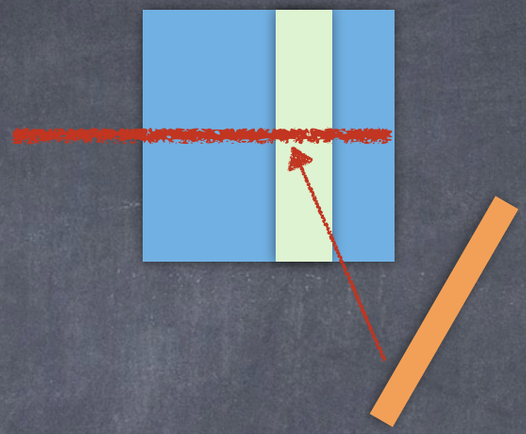
H2O
(20x20x20) *cm^3*

Bone
from z=10 cm
to z=15 cm





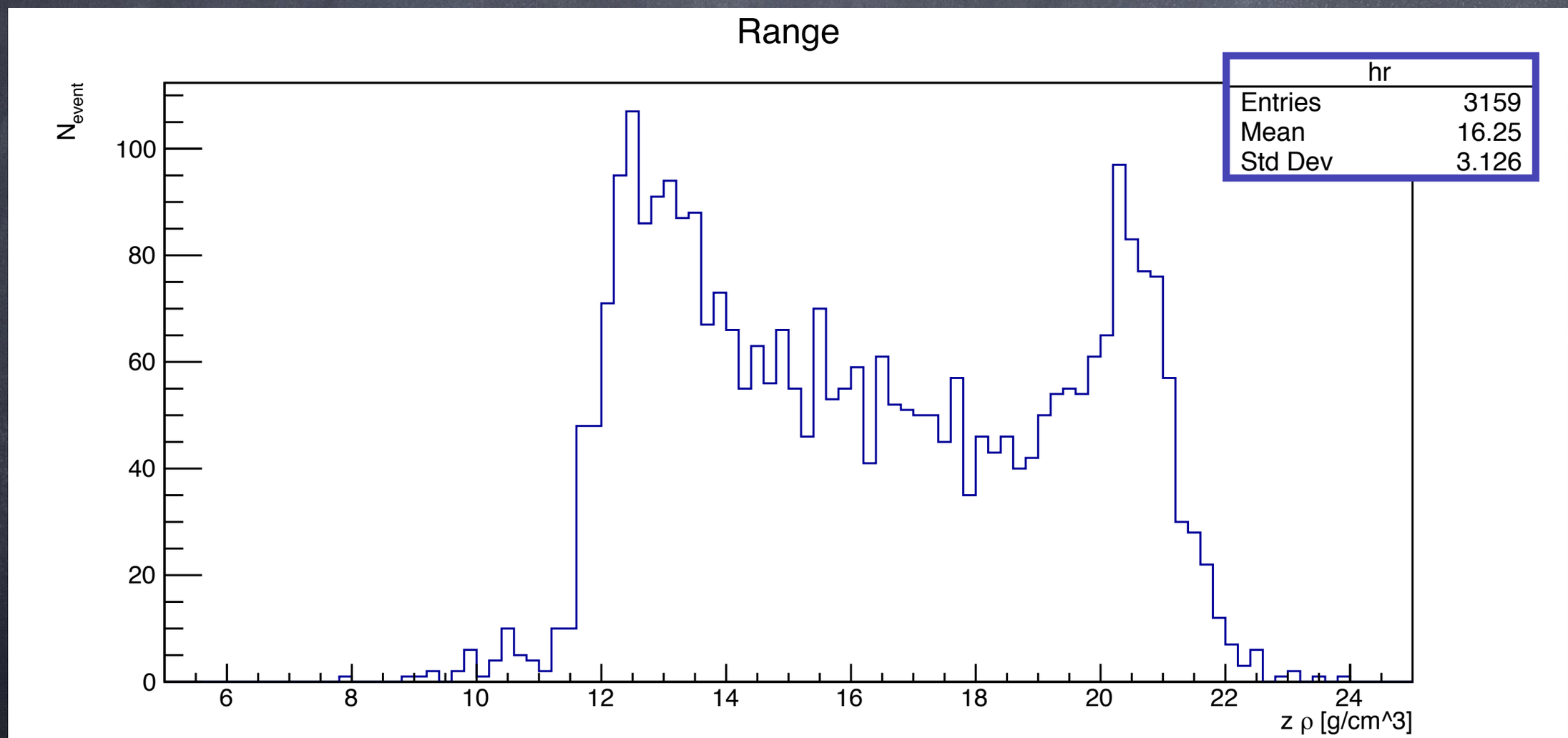
DP at 60°, Target: H2O+Bone Range (Backtracking)



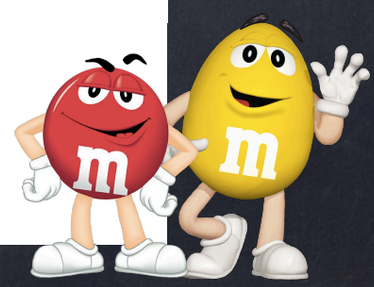
TARGET:
H2O
(20x20x20) *cm^3*
Bone
from z=10 cm to z=15 cm

DP:
(20x20)*cm^2*
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*

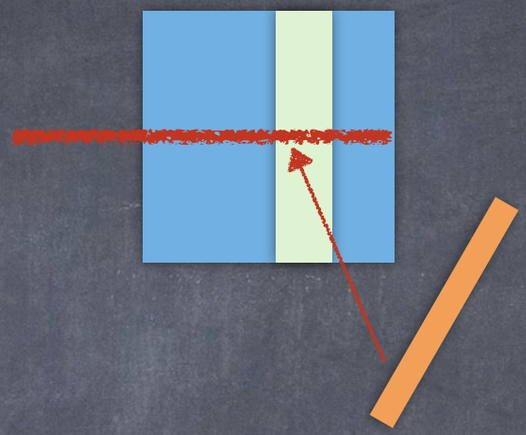


Not considering nuclear interactions



DP at 60°, Target: H2O+Bone

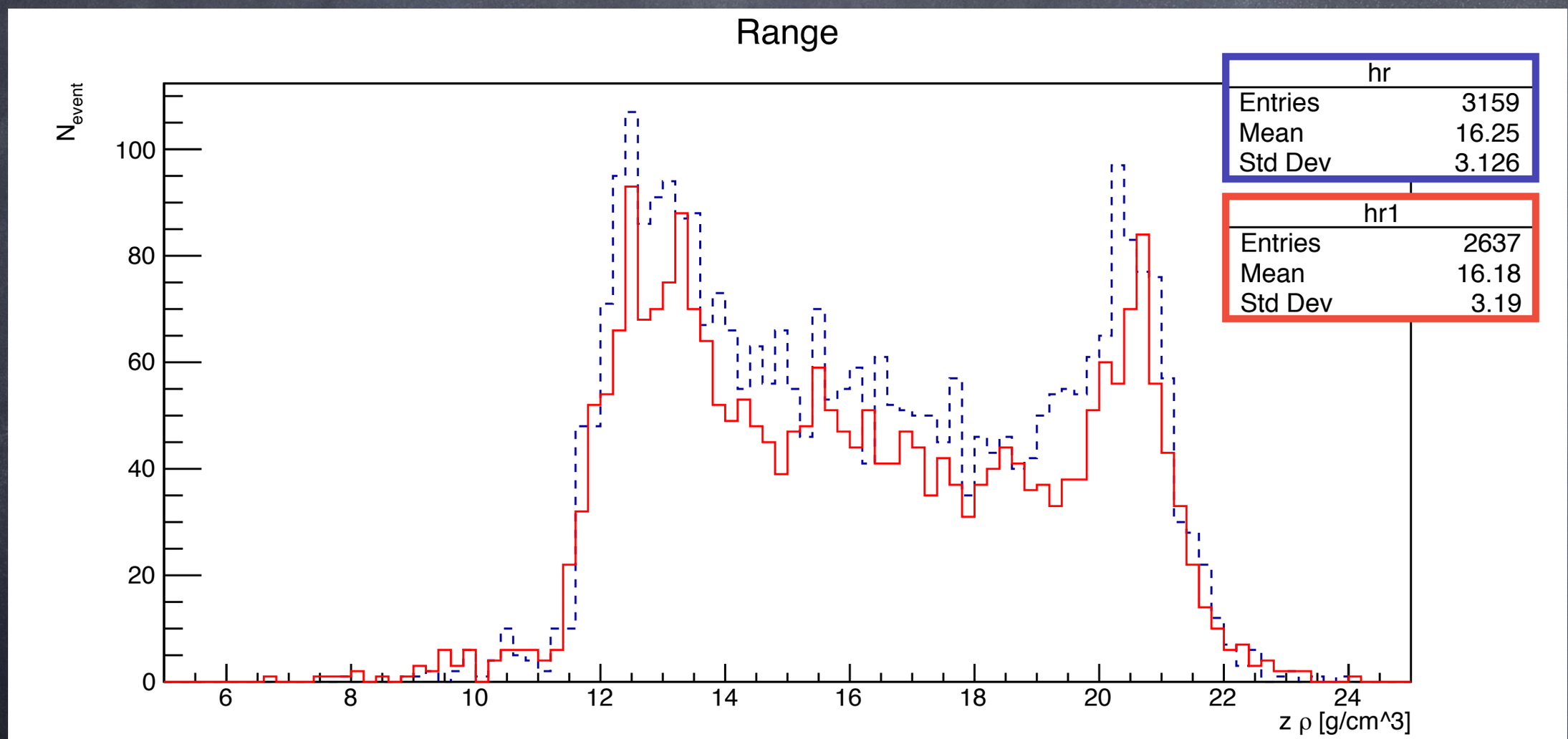
Range (Backtracking)



TARGET:
H2O
(20x20x20) *cm^3*
Bone
from z=10 cm to z=15 cm

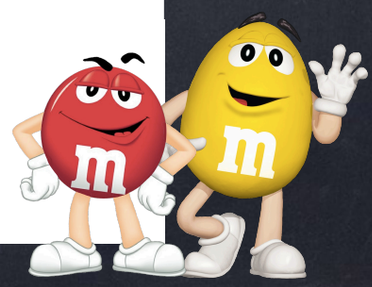
DP:
(20x20)*cm^2*
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*



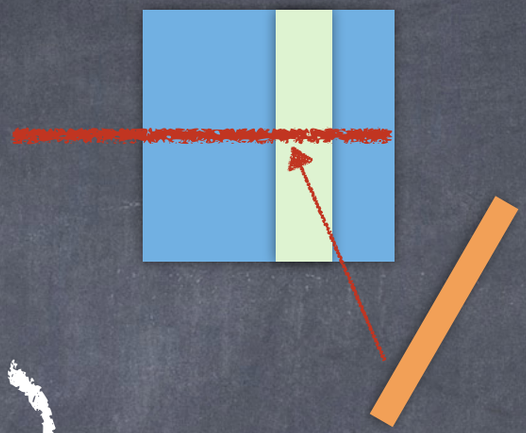
Not considering nuclear interactions

Considering nuclear interactions



DP at 60°, Target: H2O+Bone

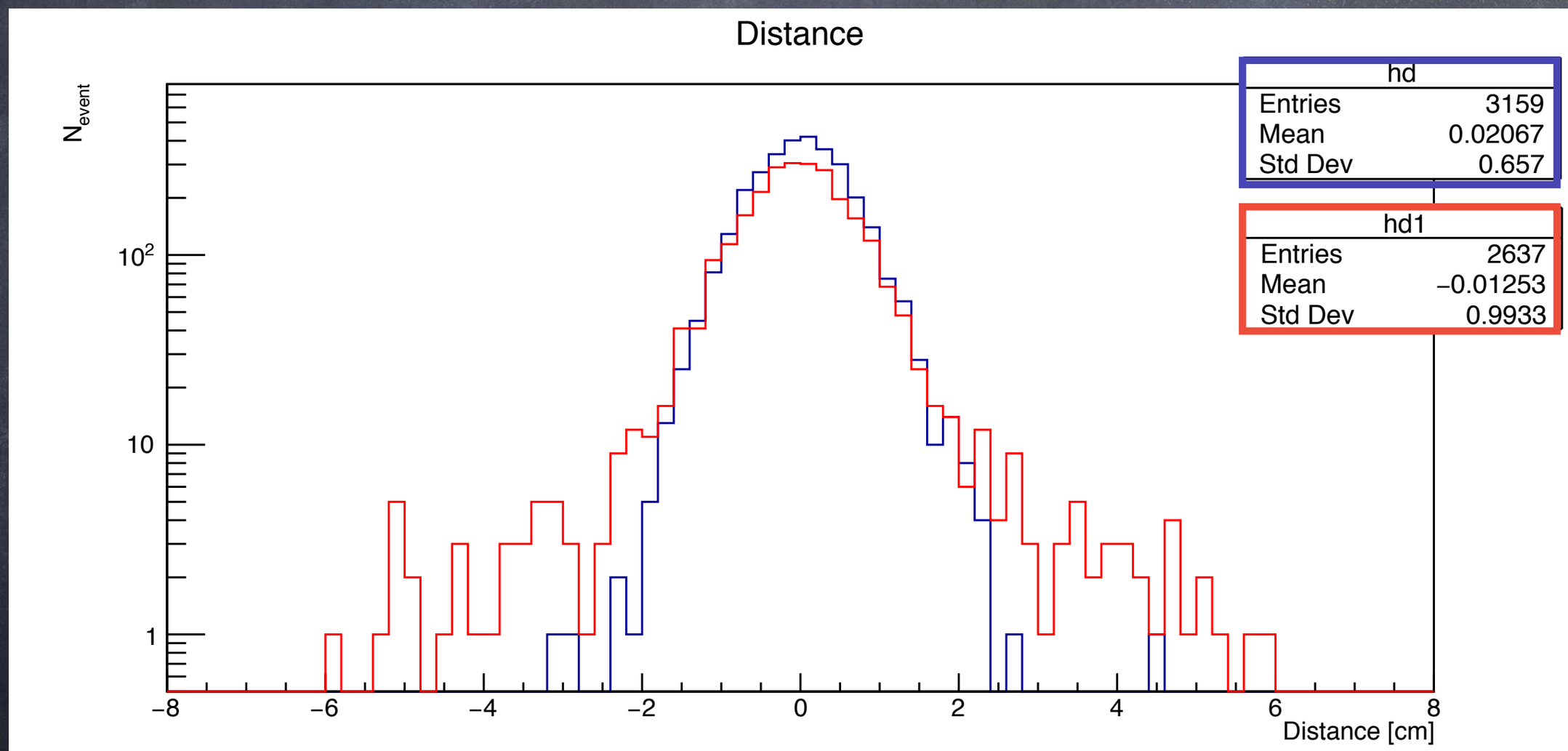
Minimum Approach Distance (Backtracking)



TARGET:
H2O
(20x20x20) *cm^3*
Bone
from z=10 cm to z=15 cm

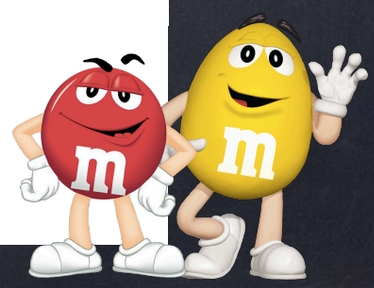
DP:
(20x20)*cm^2*
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*



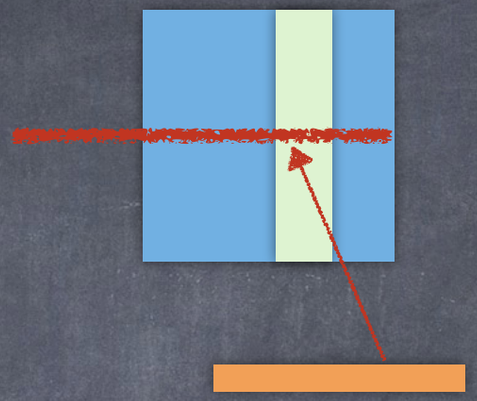
Not considering nuclear interactions

Considering nuclear interactions



DP at 90°, Target: H2O+Bone

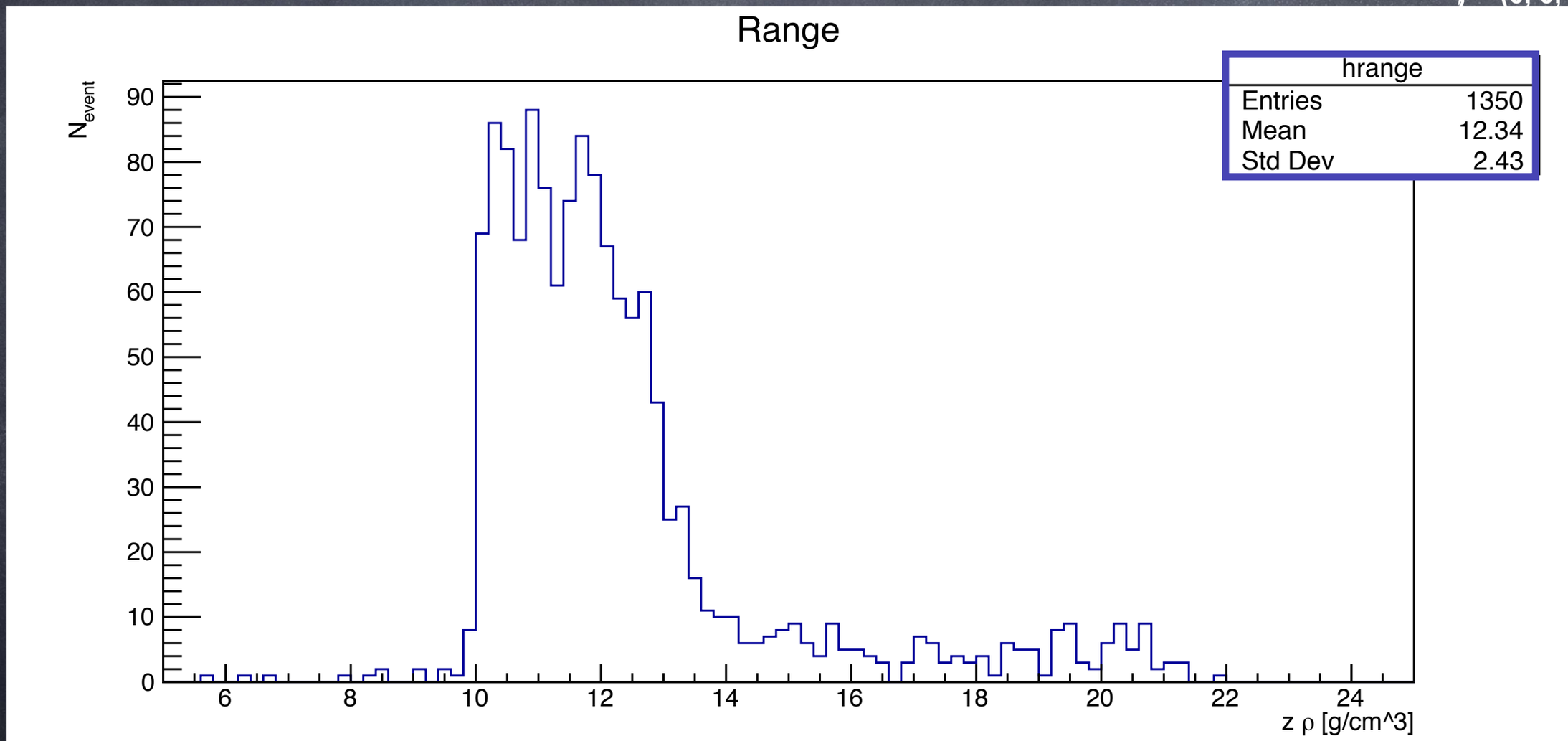
Range (Backtracking)



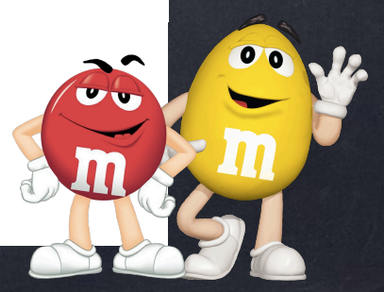
TARGET:
H20
(20x20x20) *cm^3*
Bone
from z=10 cm
to z=15 cm

DP:
(20x20)*cm^2*
Distanza: 30 *cm*

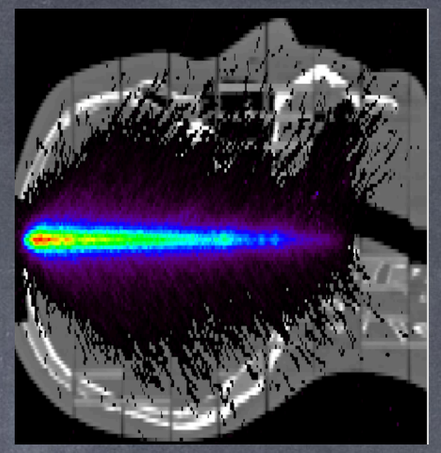
Isocentro:
(0, 0, 15) *cm*



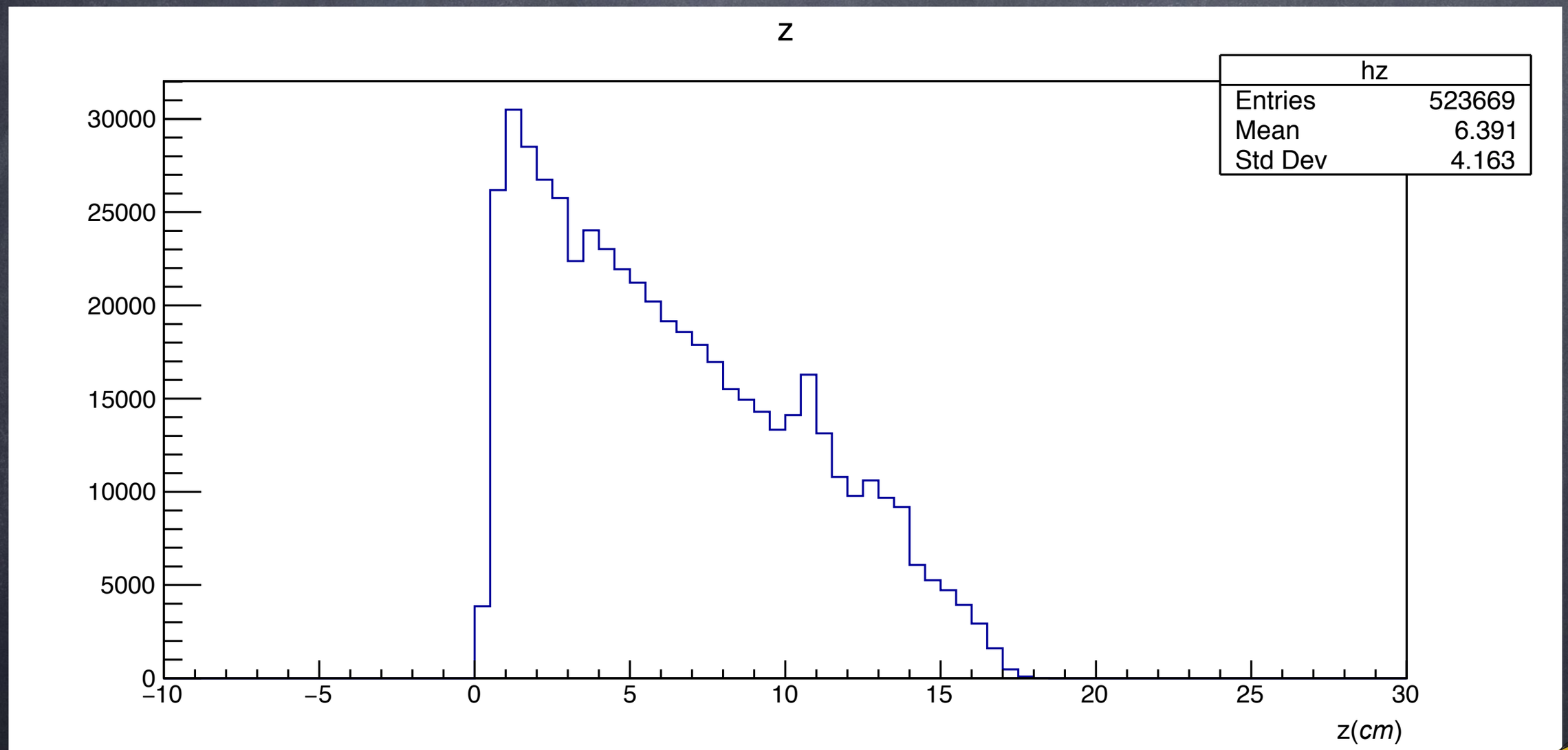
Not considering nuclear interactions

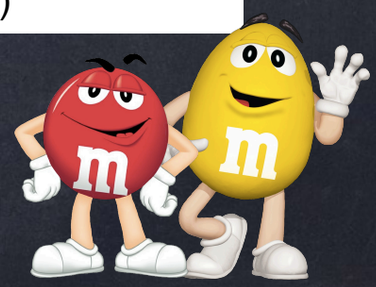


Target: CT
Initial Position

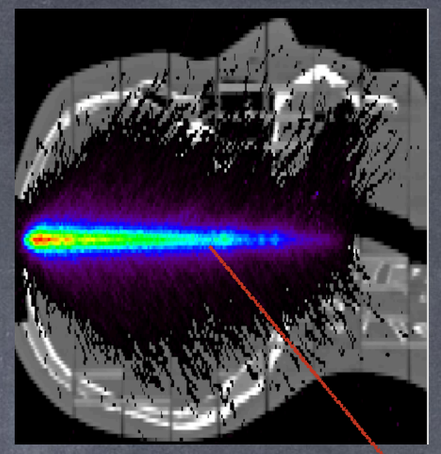


TARGET:
(15x20x20)cm^3





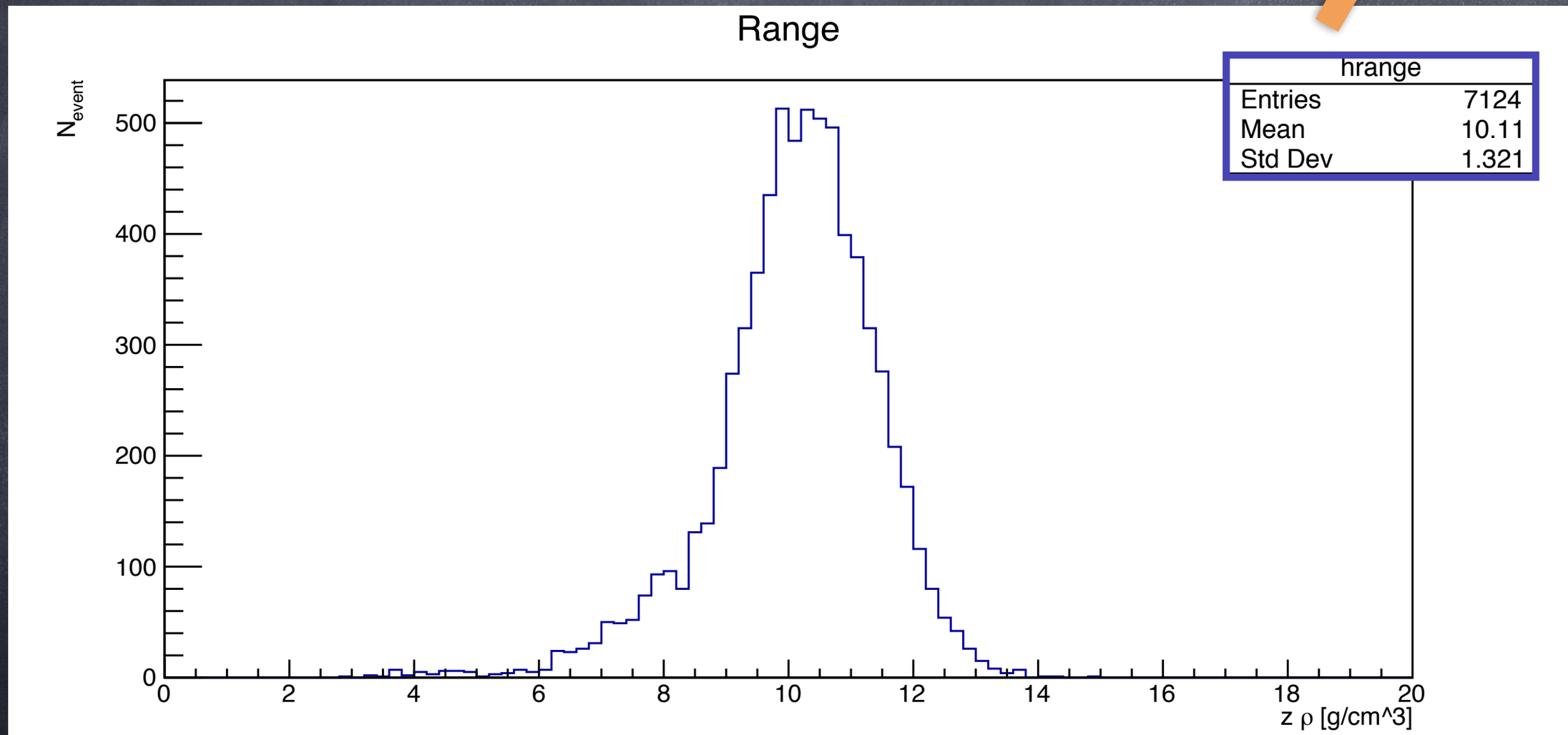
DP A 60° Target: CT Range (Backtracking)



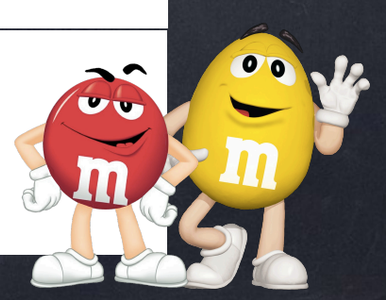
TARGET:
(15x20x20)*cm*^3

DP:
(20x20)*cm*^2
Distanza: 30 *cm*

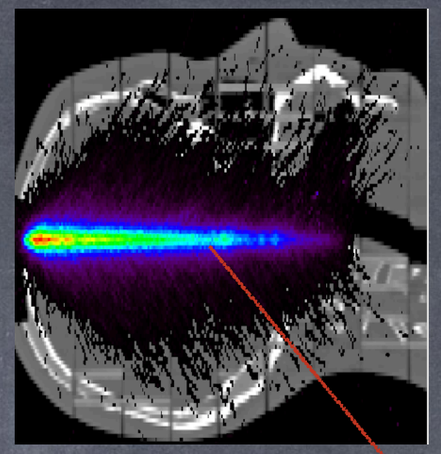
Isocentro:
(0, 0, 15) *cm*



Not considering nuclear interactions



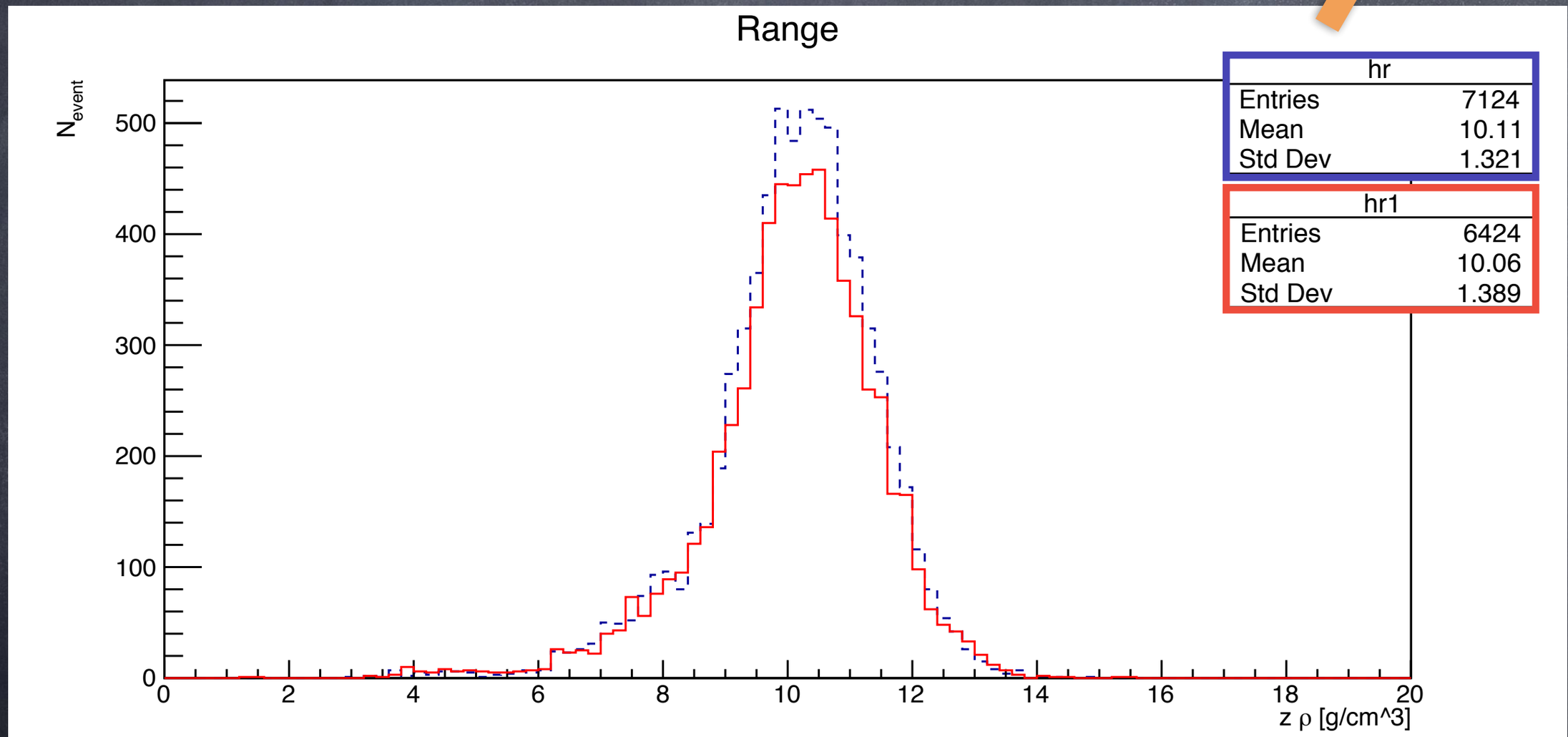
DP A 60° Target: CT Range (Backtracking)



TARGET:
(15x20x20)*cm*^3

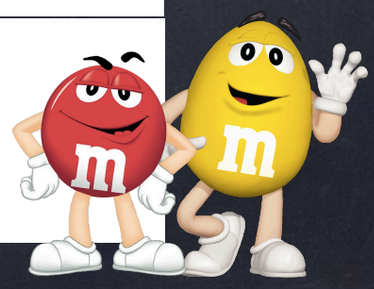
DP:
(20x20)*cm*^2
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*

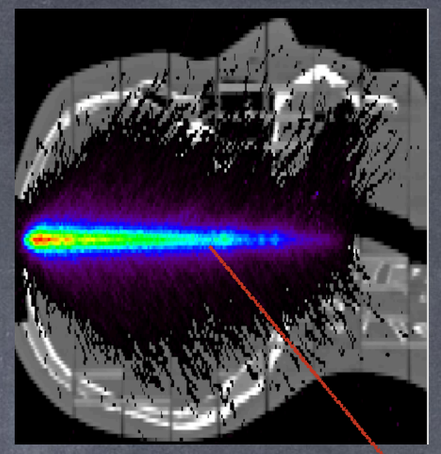


Not considering nuclear interactions

Considering nuclear interactions



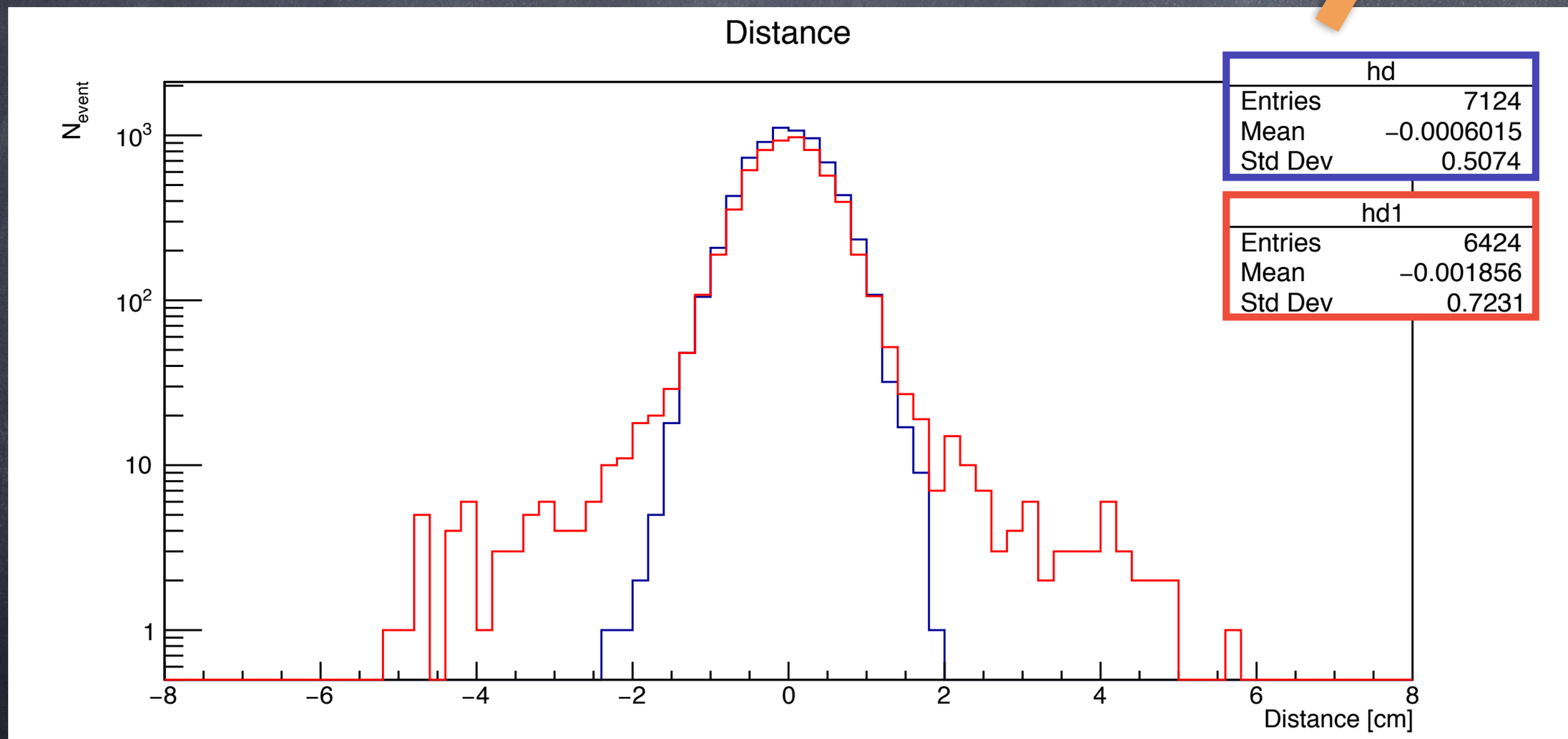
DP A 60° Target: CT Minimum Approach Distance (Backtracking)



TARGET:
(15x20x20)*cm*^3

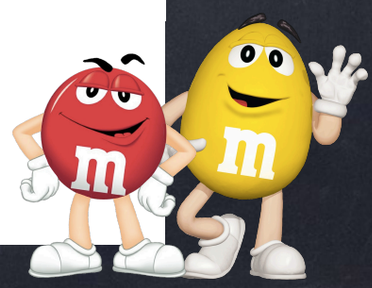
DP:
(20x20)*cm*^2
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*

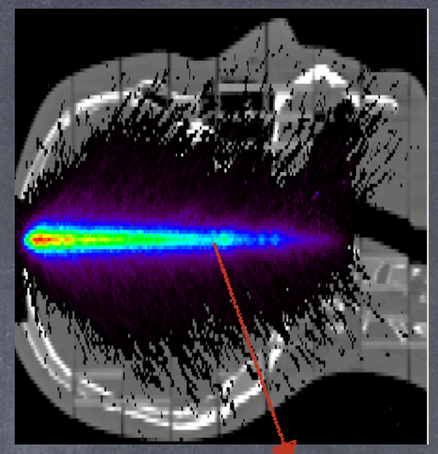


Not considering nuclear interactions

Considering nuclear interactions



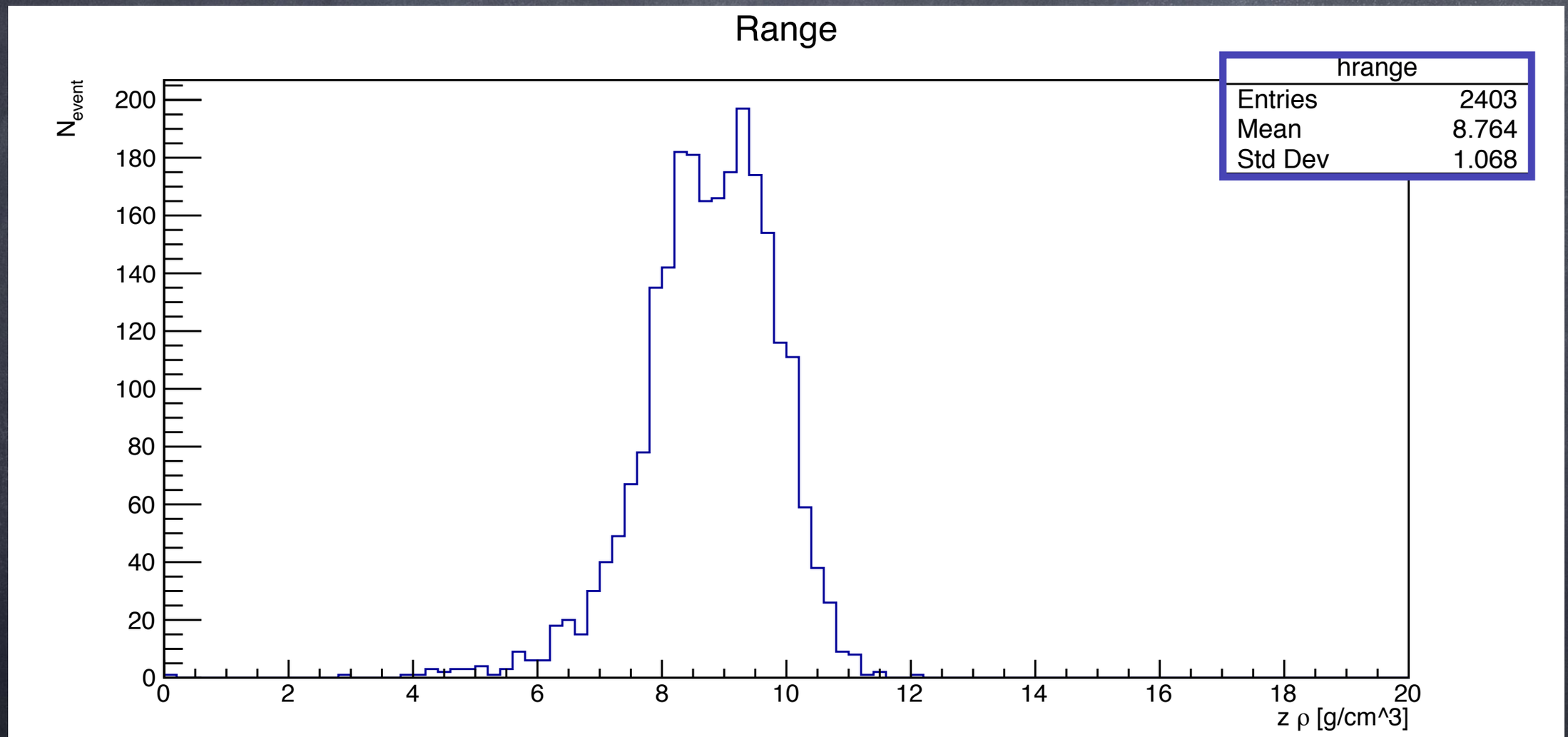
DP A 90° Target: CT Range (Backtracking)



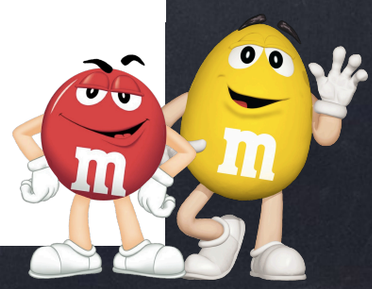
TARGET:
(15x20x20)*cm*^3

DP:
(20x20)*cm*^2
Distanza: 30 *cm*

Isocentro:
(0, 0, 15) *cm*

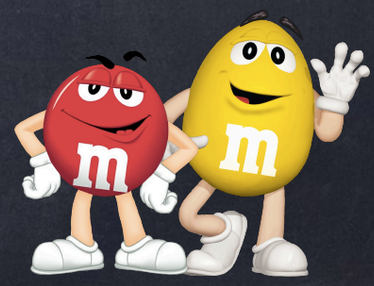


Not considering nuclear interactions



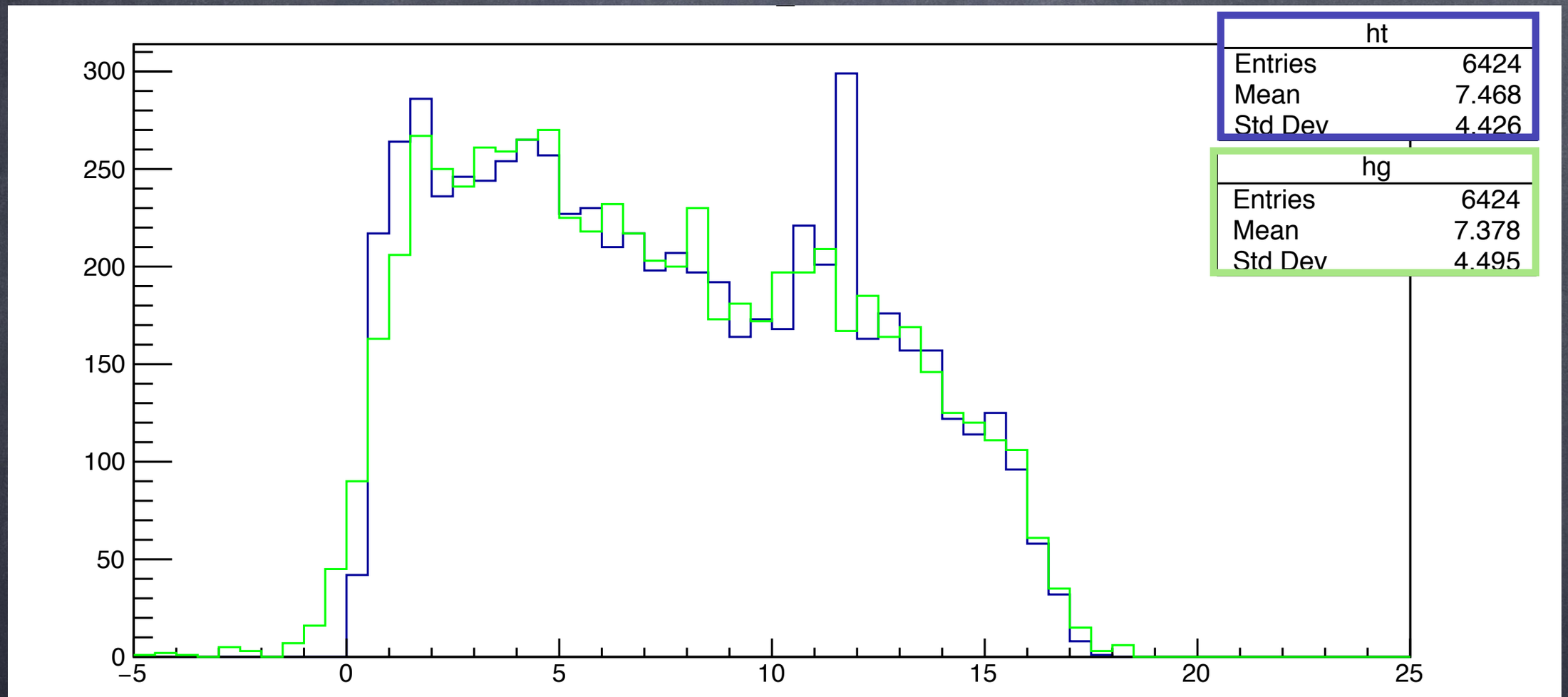
Next step

- Reconstruction of the emission profile starting from the detected secondary particle in the DP



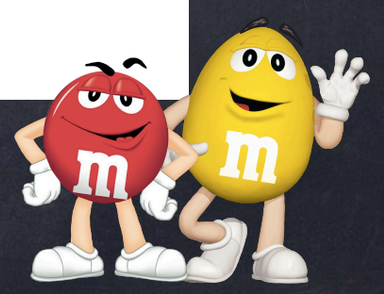
Thanks

True - Guess value for MLEM analysis (with nuclear interaction)



True values

Guess values



Distance MLEM