

## A How-To

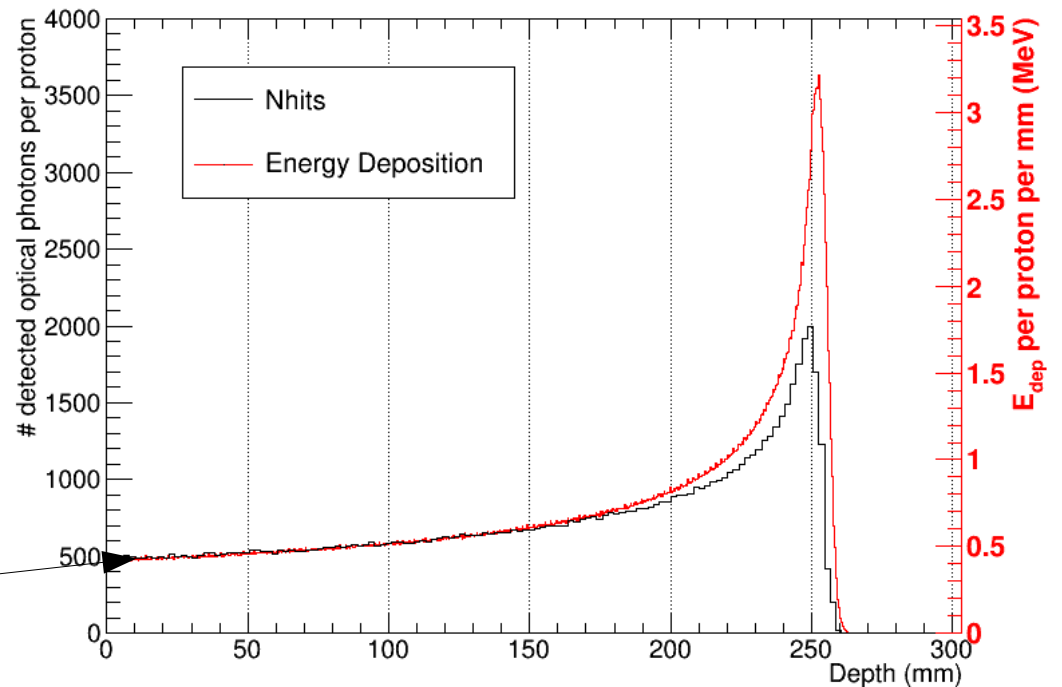
Get the proton range (mean proton energy) from a scintillation photon depth distribution

# Get proton range

- Idea: Fit photon depth distribution to get mean proton energy
- To do this you need a fit function for the photon depth distribution
- It should be possible to derive this function from a dose depth distribution (Bortfeld1998)
- I think this is terribly complicated
- In addition, Bortfeld says that a fit to dose depth distributions yields only poor accuracy in mean proton energy
- I think that resolution will become worse with a modified fit function

- Other idea: use 80%-rule and power law
- $R_0 = z_{80}$                       and                       $R_0 = a E_0^{(1/p)}$
- Range from Edep: 254.347 mm  
    $E_0$  from Edep: 197.462 MeV
- Range from Nhits: 251.947 mm  
    $E_0$  from Edep: 196.407 MeV

200 MeV



The black curve is an unmodified photon depth distribution

- Range from Edep: 30.1211 mm  
E\_0 from Edep: 59.1568 MeV
- Range from Nhits: 27.7075 mm  
E\_0 from Edep: 56.4302 MeV

The offset between the two calculated ranges seems to be constant (1 layer of 2mm)

60 MeV

