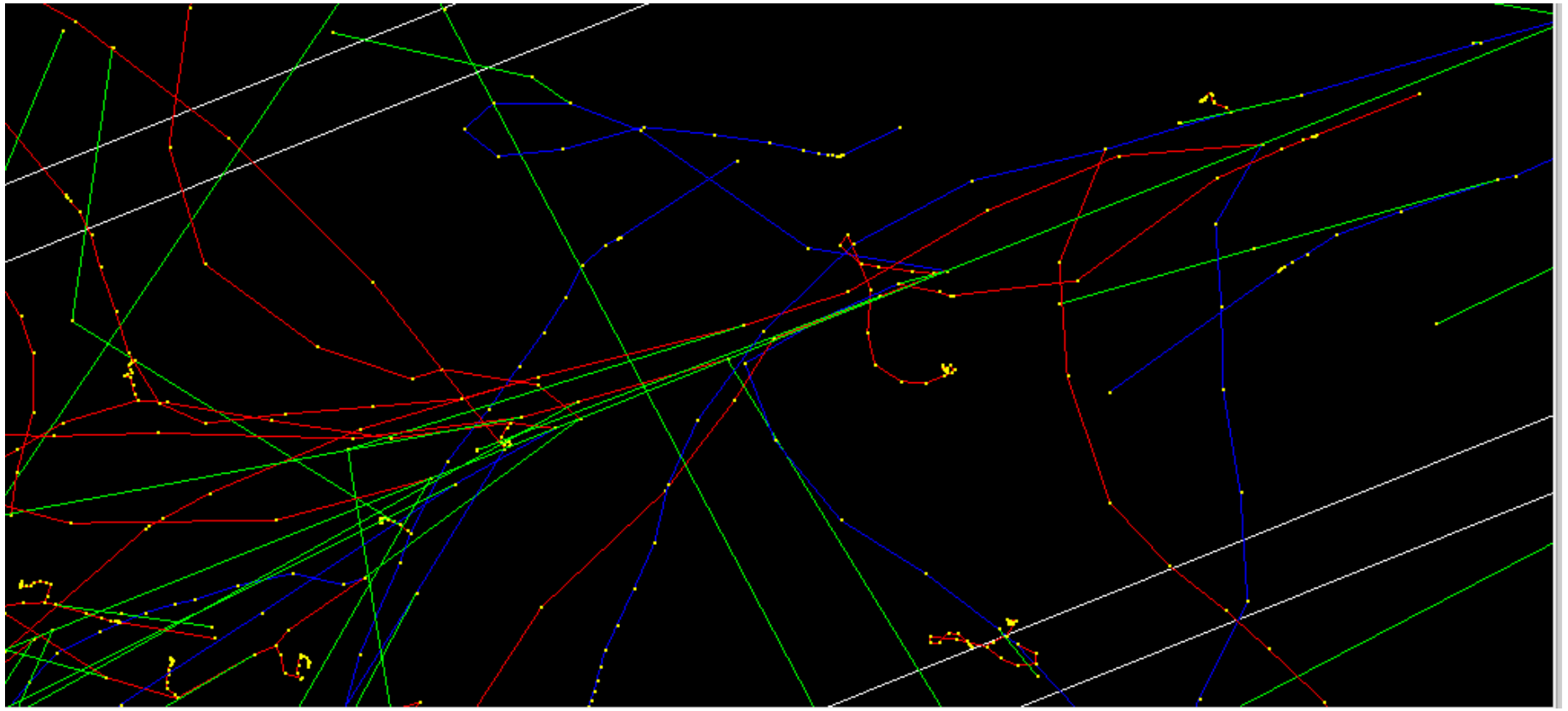
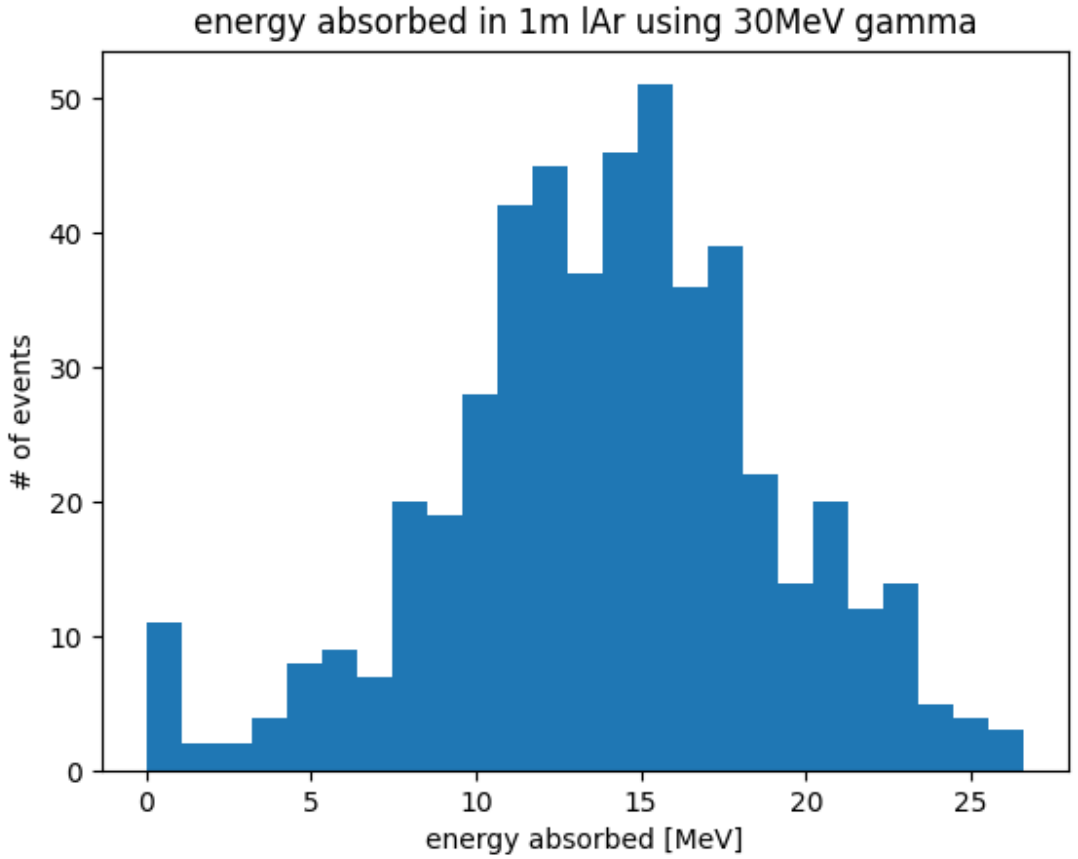
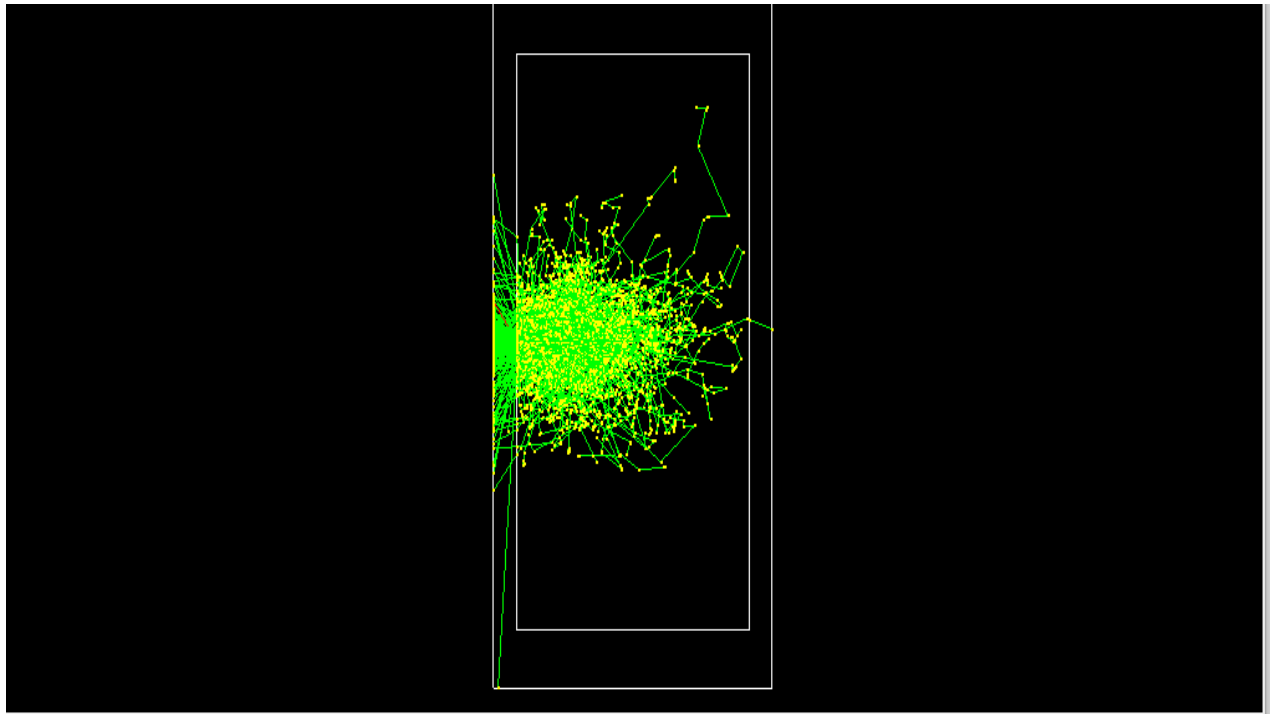
Simulation of photons passing through liquid argon



The following is a histogram of the energy absorbed by the liquid argon as the photons pass through it



Visual representation of the beam of photons passing through the liquid argon

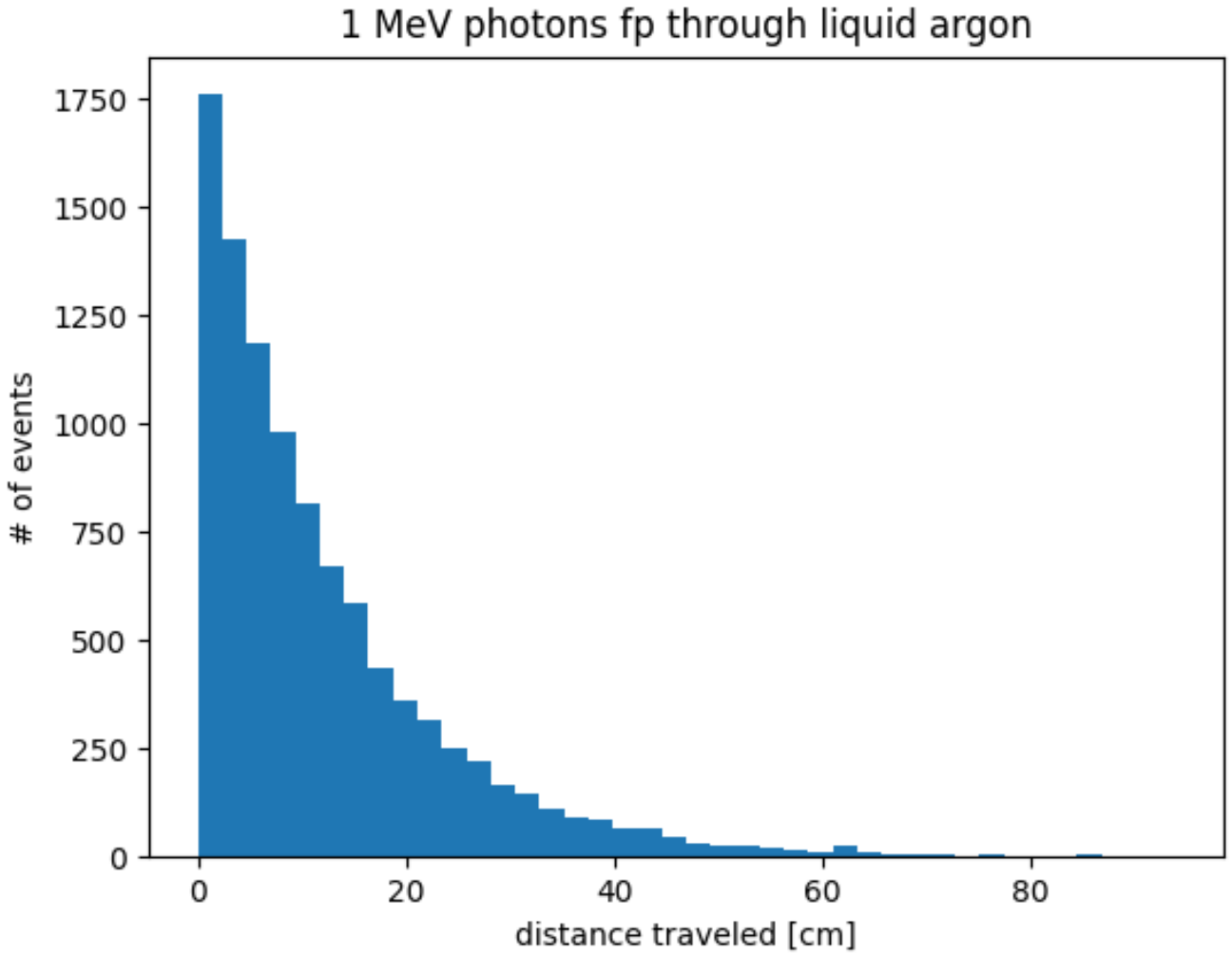


Validation of simulation – photon free mean path

- In order to validate our simulation, we will first check the photon's free mean path through the liquid argon with different initial energy, and compare it against the literature.

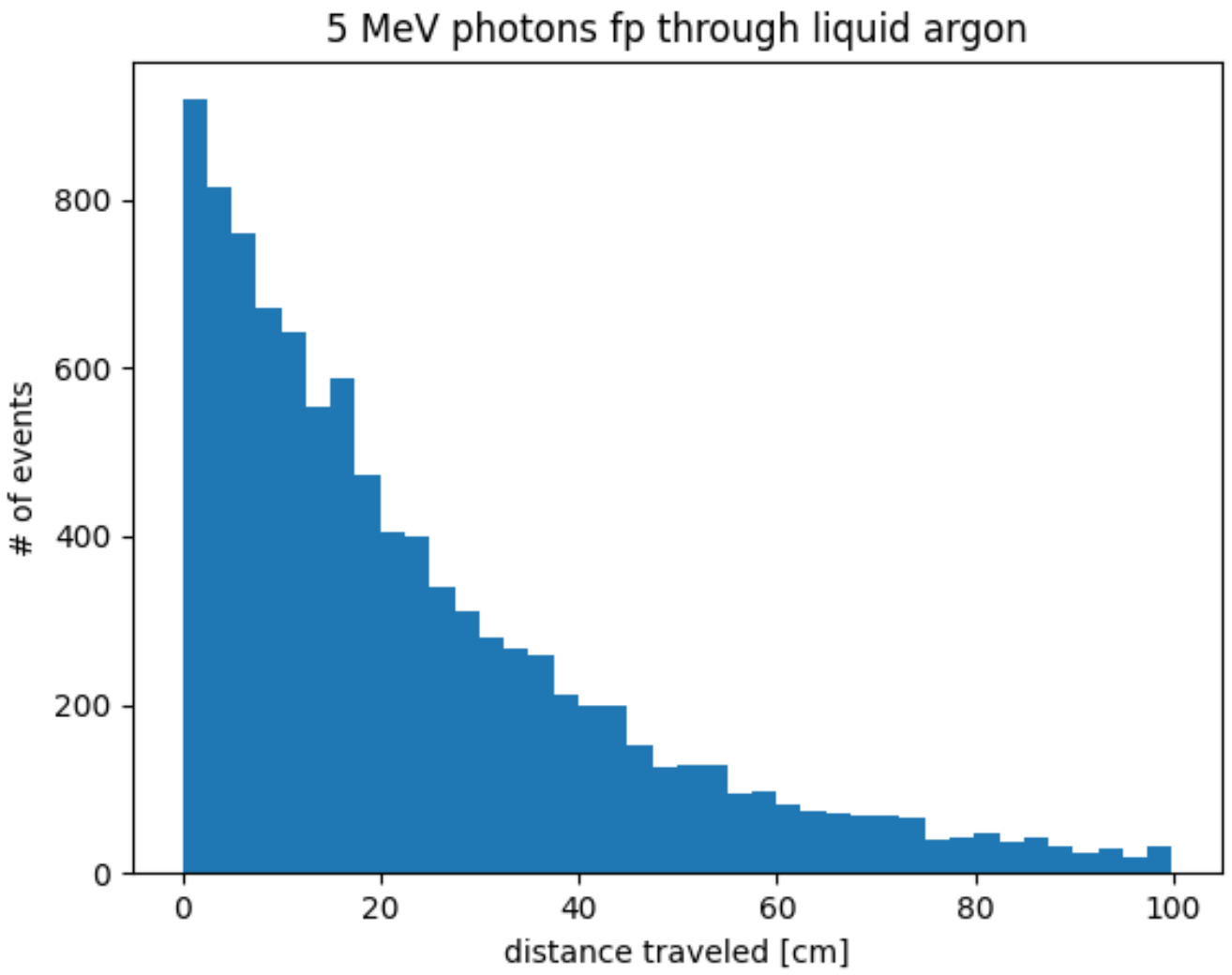
1 MeV photons mean free path distribution

- mean value of mean free path of 1MeV photons is : 12.2 cm
- std of 1MeV photons mean free path distribution is: 12.1 cm



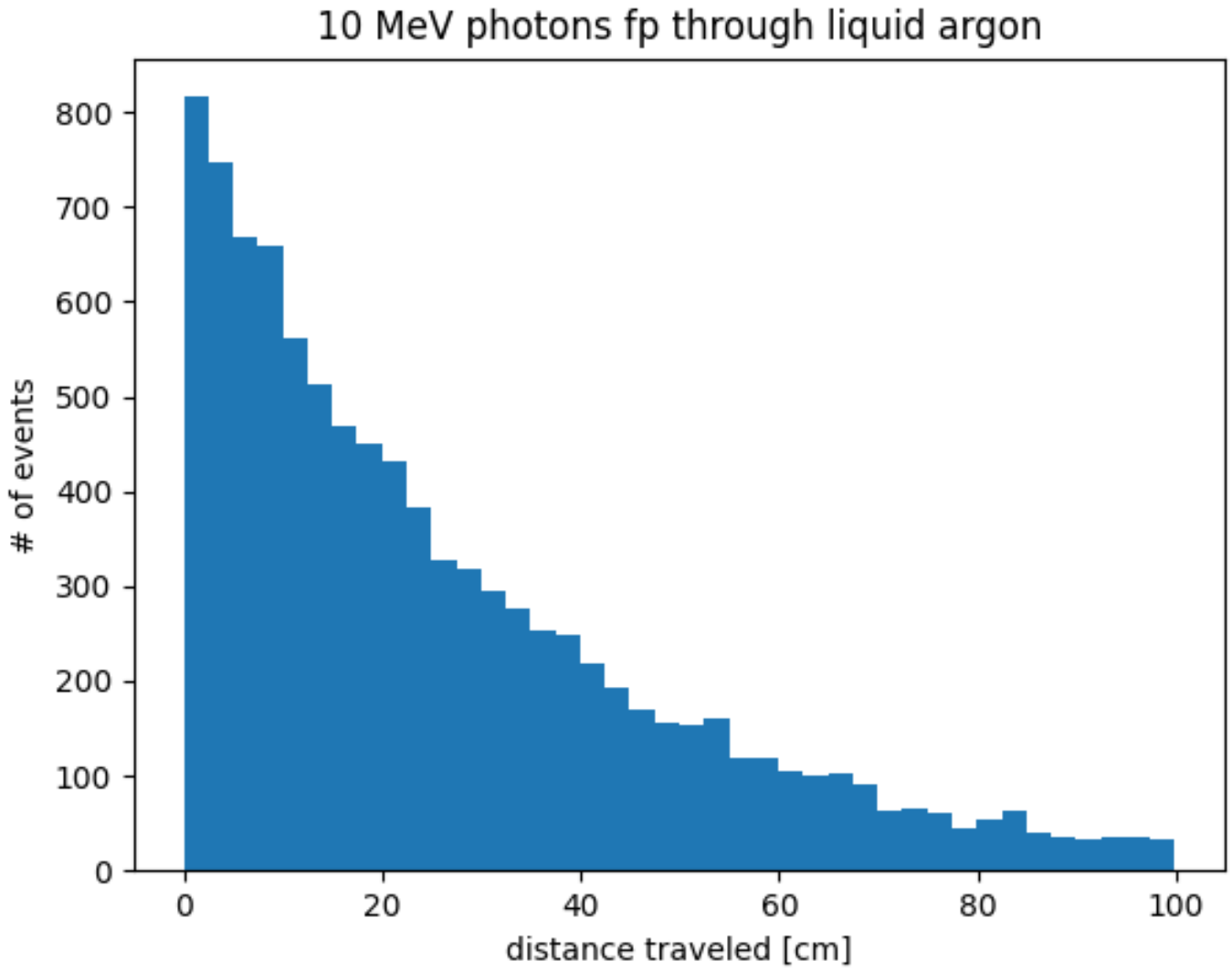
5 MeV photons mean free path distribution

- mean value of mean free path of 5 MeV photons is : 23.7 cm
- std of 1MeV photons mean free path distribution is: 21.2 cm



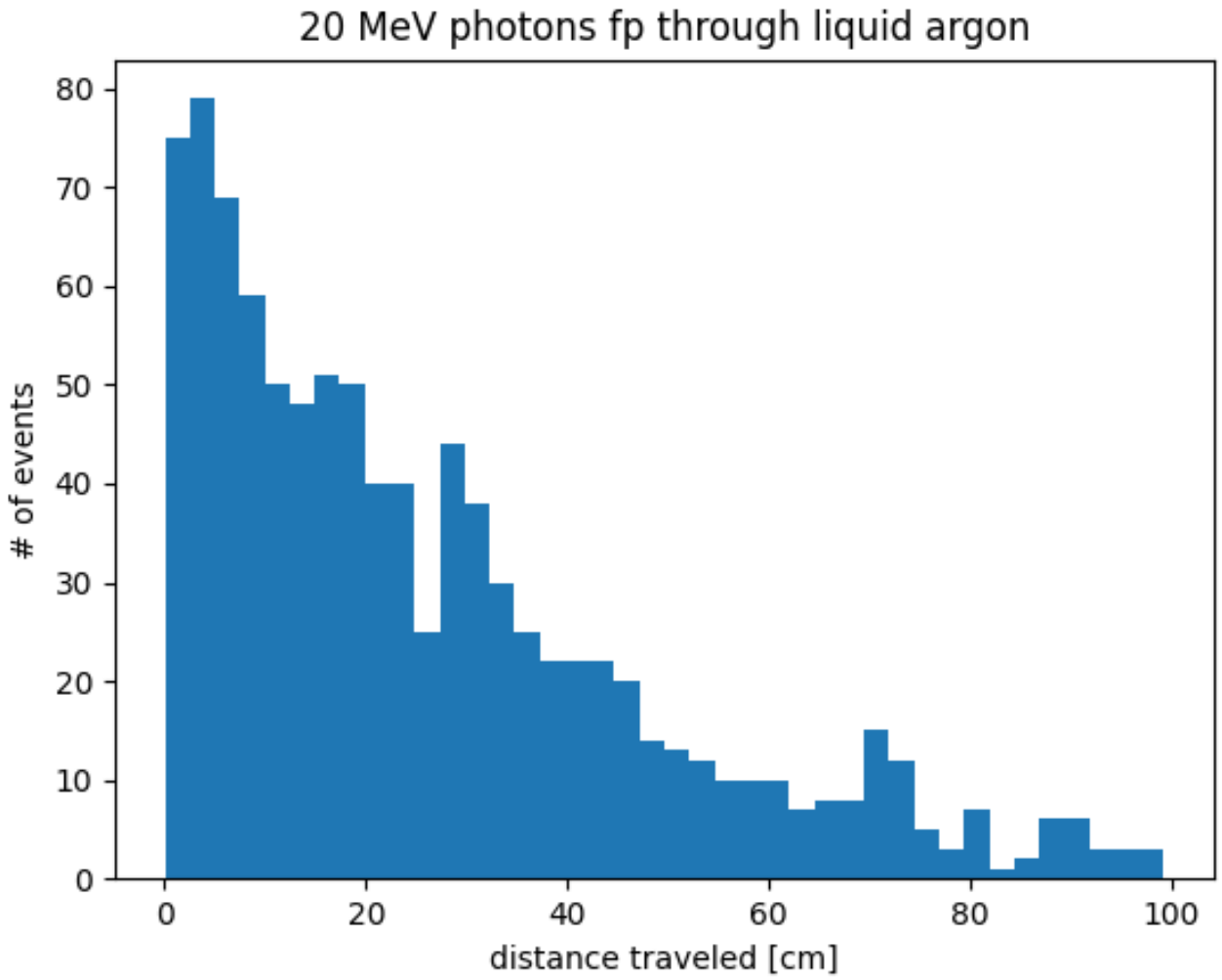
10 MeV photons mean free path distribution

- mean value of mean free path of 5 MeV photons is : 26.0 cm
- std of 1MeV photons mean free path distribution is: 22.5 cm



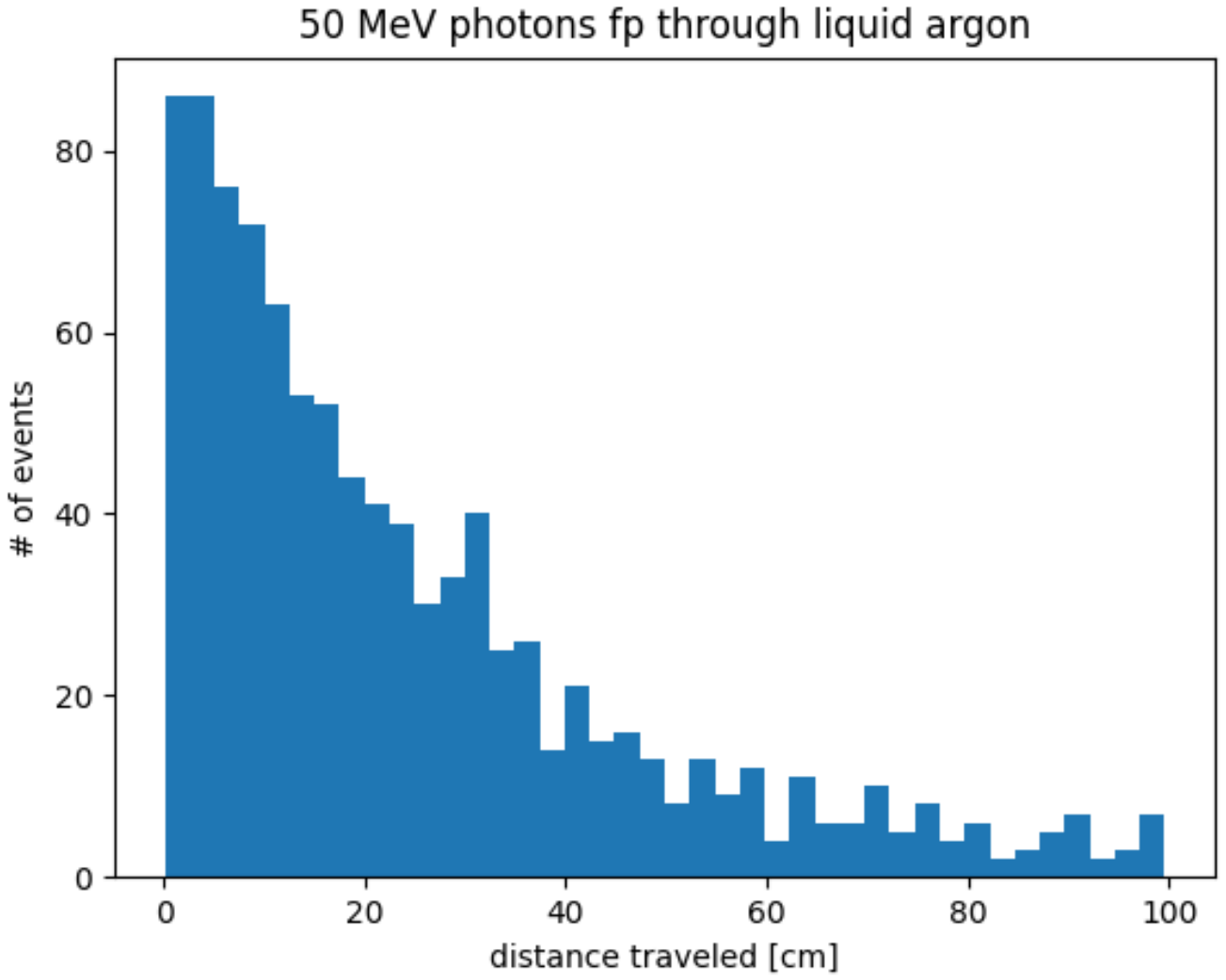
20 MeV photons mean free path distribution

- mean value of mean free path of 5 MeV photons is : 26.1 cm
- std of 1MeV photons mean free path distribution is: 22.2 cm



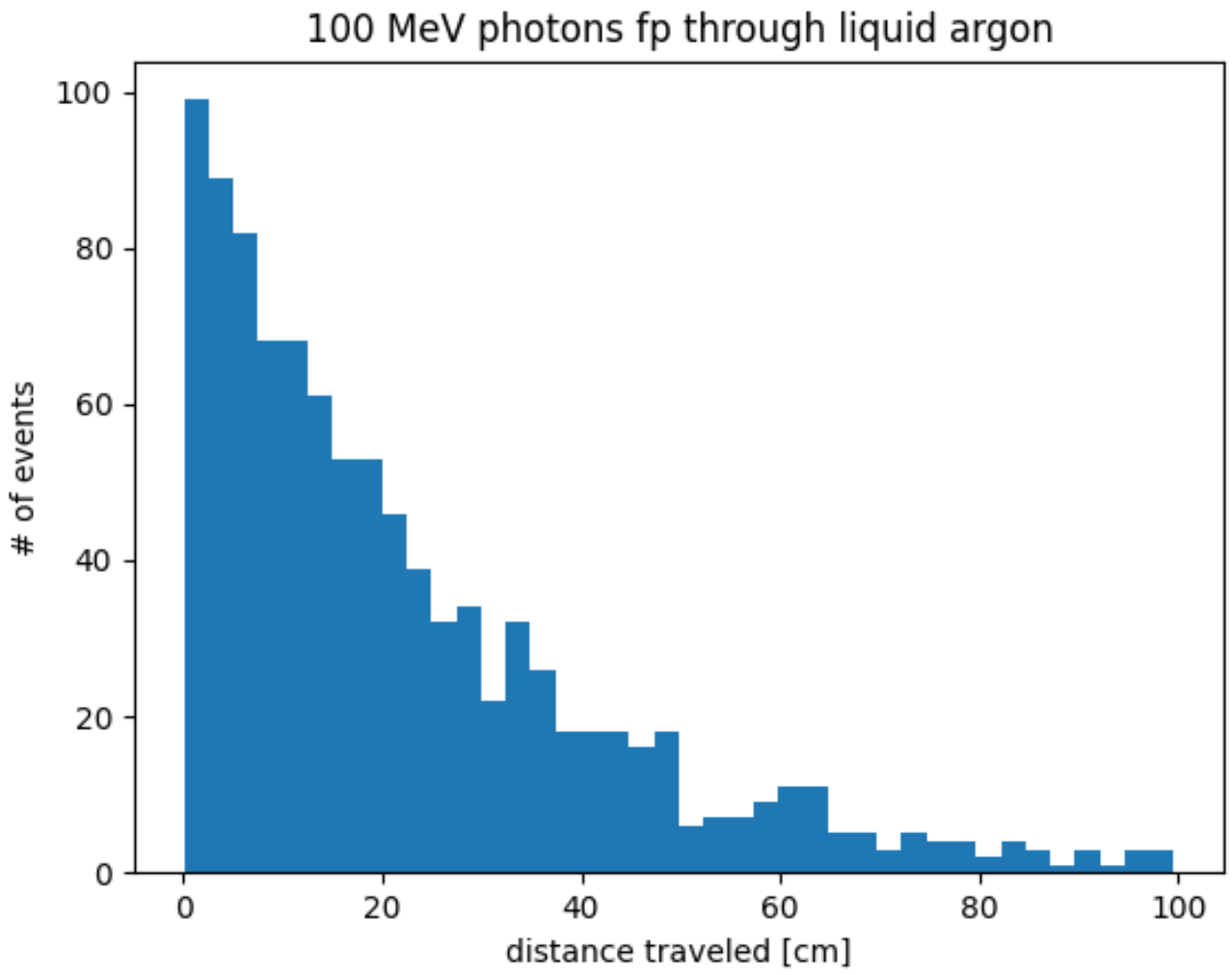
50 MeV photons mean free path distribution

- mean value of mean free path of 5 MeV photons is : 24.4 cm
- std of 1MeV photons mean free path distribution is: 22.4 cm



100 MeV photons mean free path distribution

- mean value of mean free path of 5 MeV photons is : 22.1 cm
- std of 1MeV photons mean free path distribution is: 20.1 cm



Mean Free Path vs photon Energy