Update of LUXE GEANT4 Simulation

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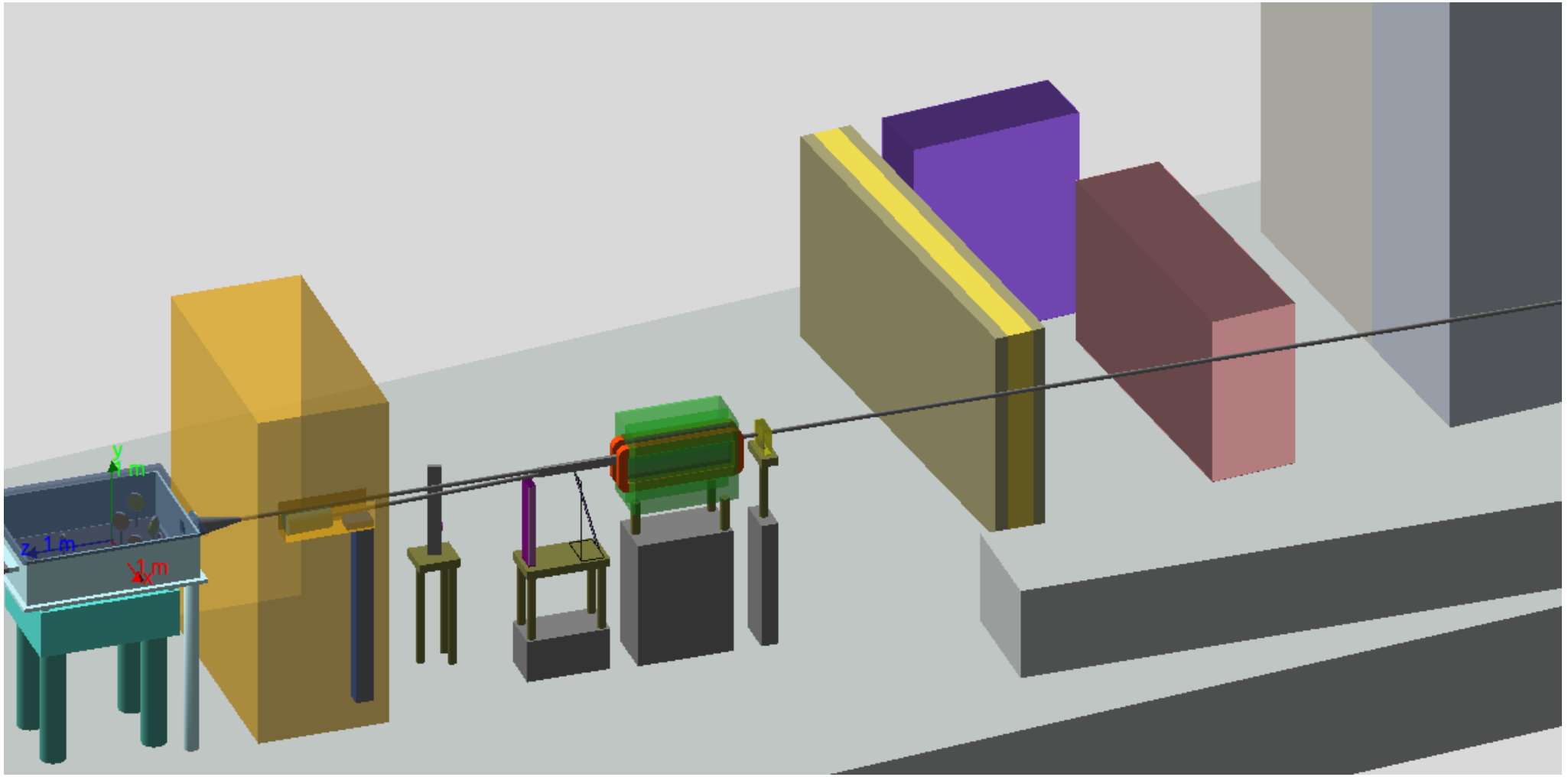
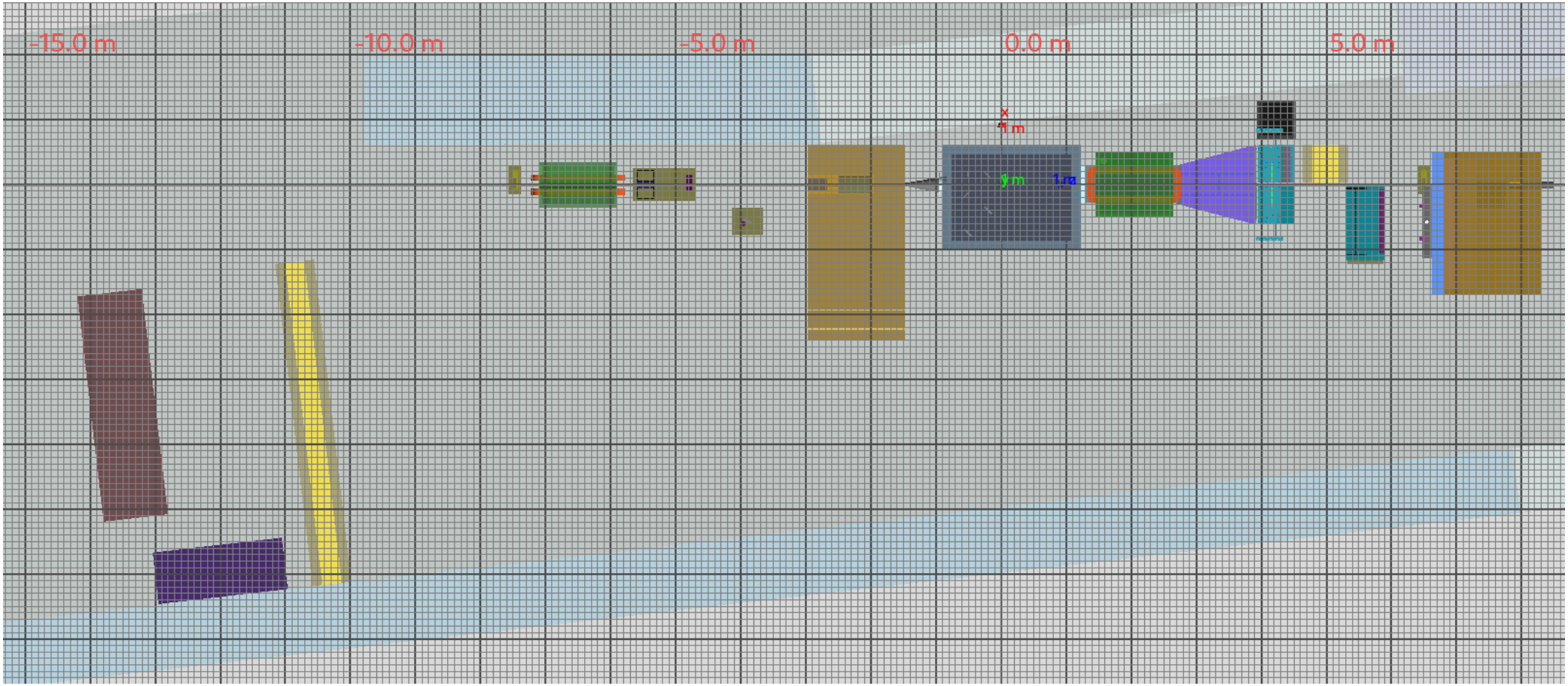
LUXE S&A Meeting
March 7, 2022

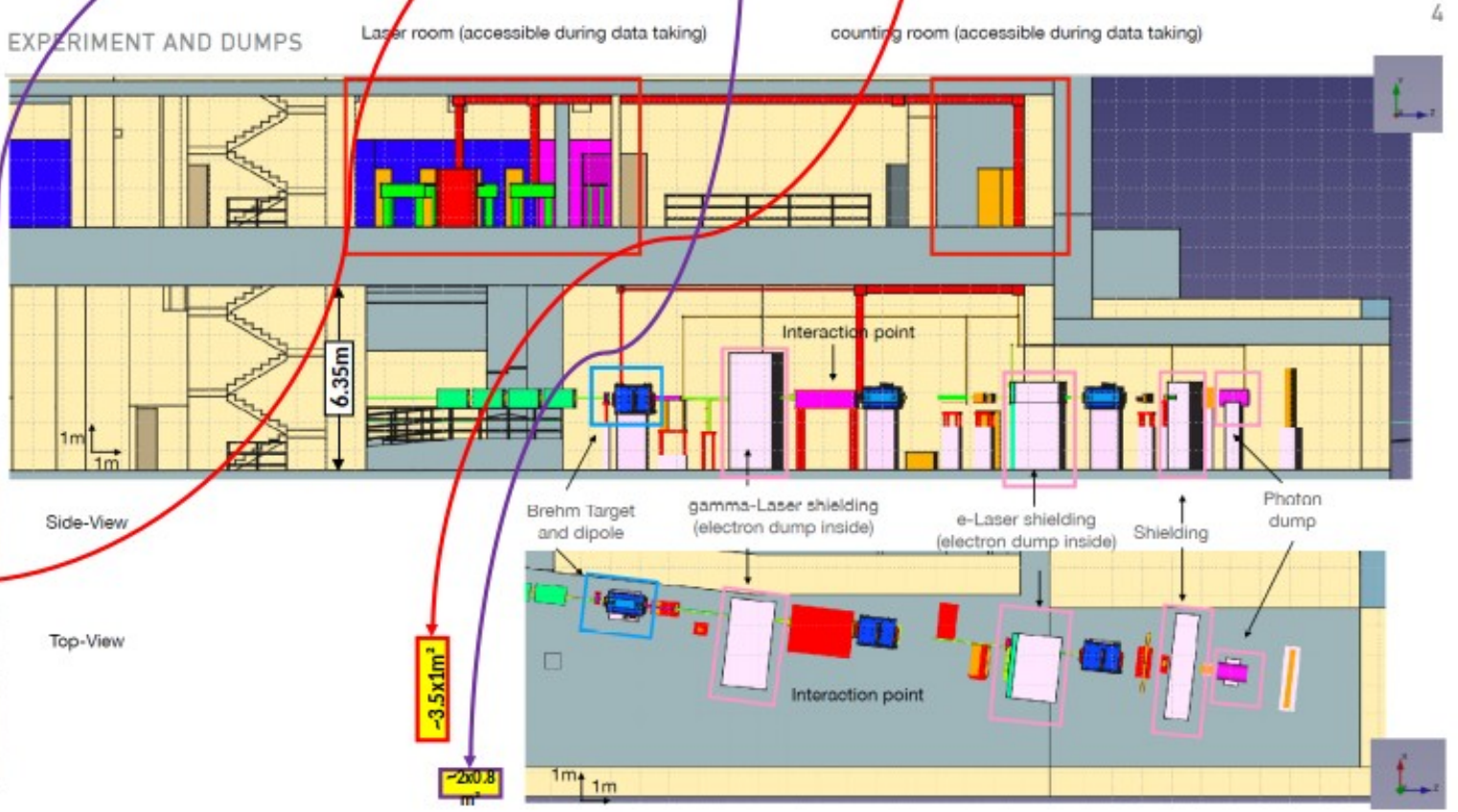

y
1 m
z
1 m
x
1 m

XFEL Service Components and Shielding



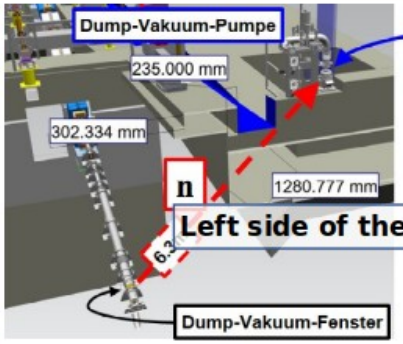
My Concern is about Trips in the TLD-Dump PLC

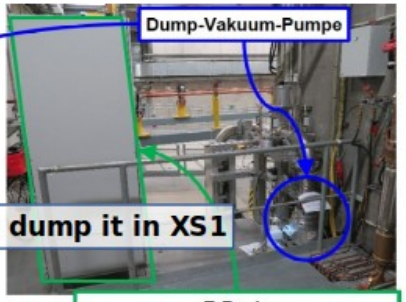
or Damage to the Electronics for the Dump Exchange



What Level of Neutron Field is aimed for, i.e. „safe“?

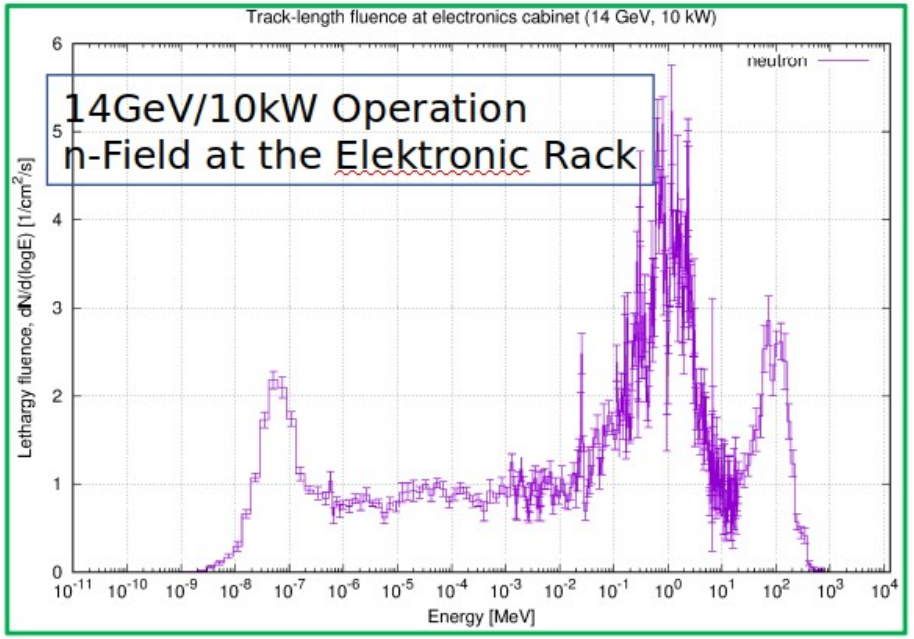
Regard the n-fluence as created by a 10kW beam near the (old) pos. of pump and PLC as „safe“
(factor 3-4 below trip probability rises)
=> dN/d(logE):
~4-5/cm²/s for 1MeV n‘s
~2-3/cm²/s for 100MeV n‘s

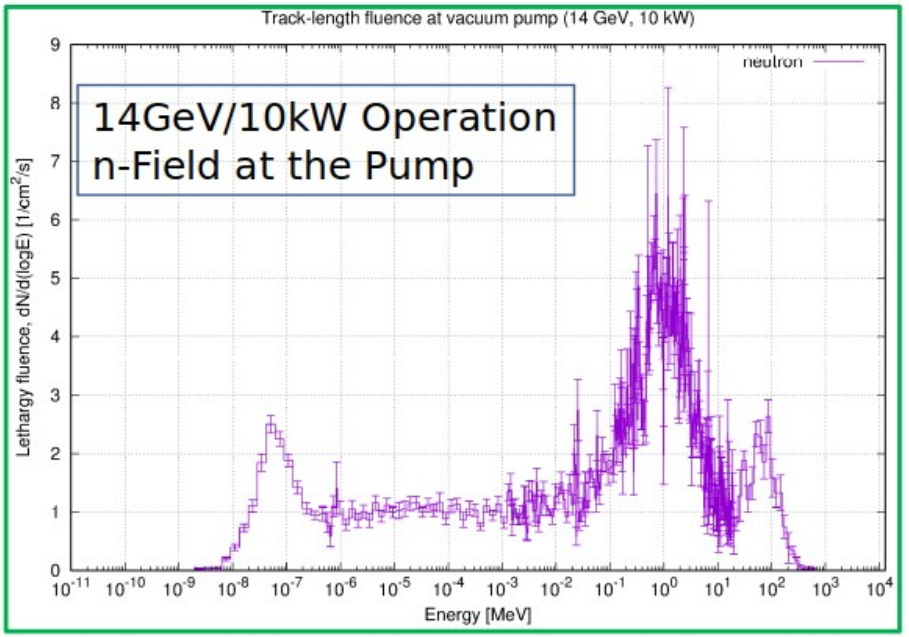




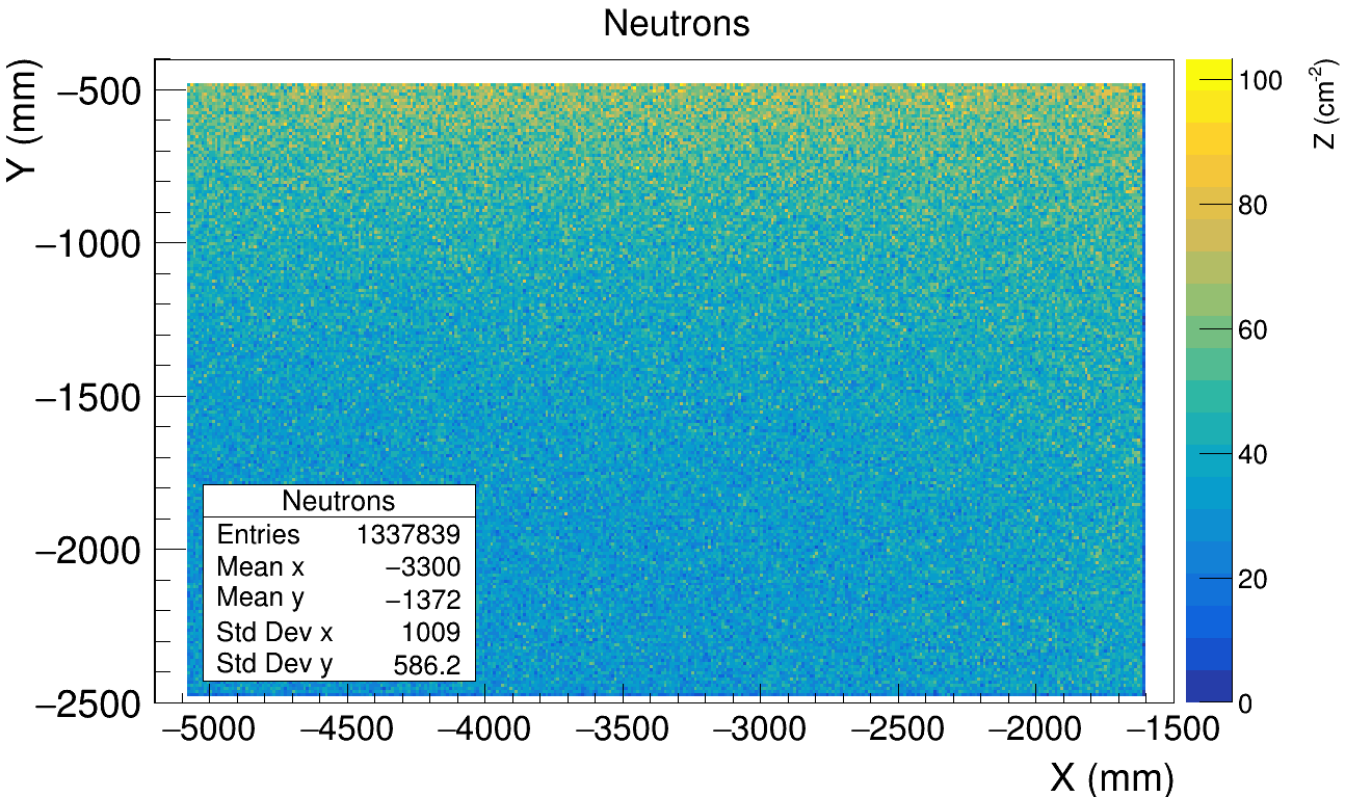
E-Rack:
- Dump-Power-Pandora Elektronik
- Dump-Vakuum-SPS

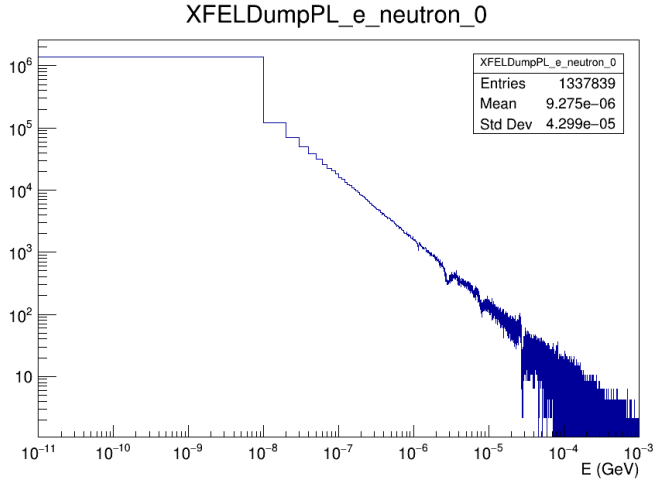
At about 30-40kW beam power, XFEL-operation sufferd from significant number of trips of the vacuum system, either
or
RELATED PLC of vac. system in the rack.
~47 trips in whole operation year 2020 !!





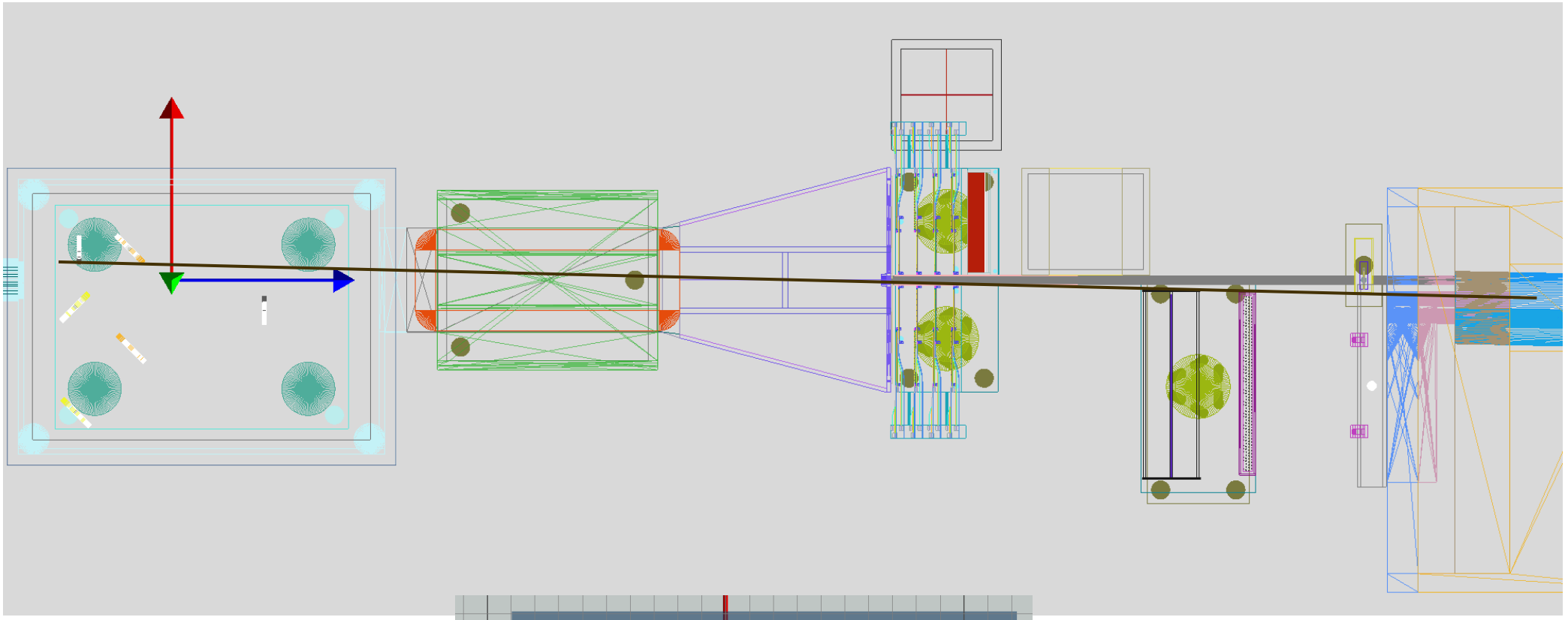
Neutrons on the Dump PLC surface

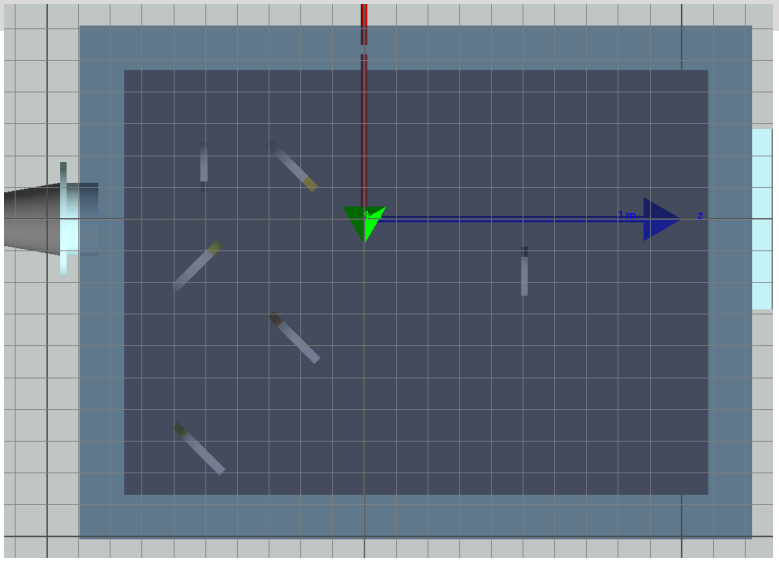




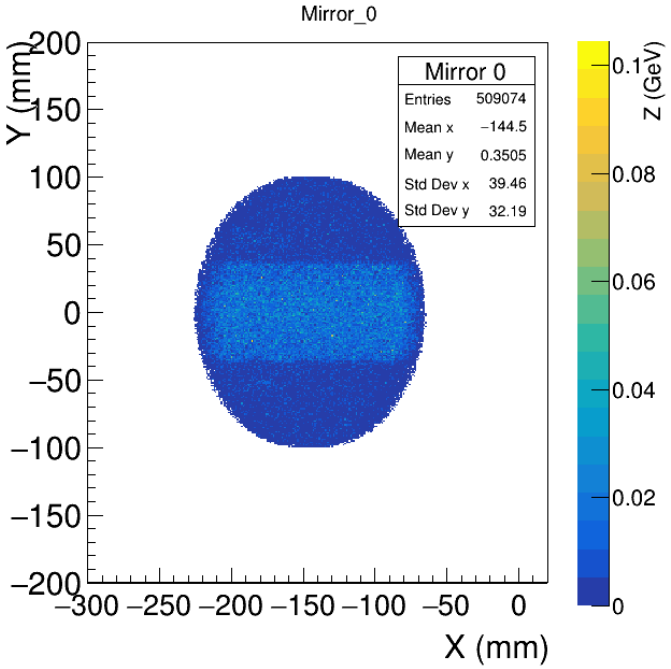
PDG	-14	-12	-11	11	12	14	22	2112	2212
per BX	180.2	55511.8	293	1278.2	30962	183.6	36974.8	115353.7	0.2
per BX/cm2	2.57E-03	7.93E-01	4.19E-03	1.83E-02	4.42E-01	2.62E-03	5.28E-01	1.65E+00	2.86E-06

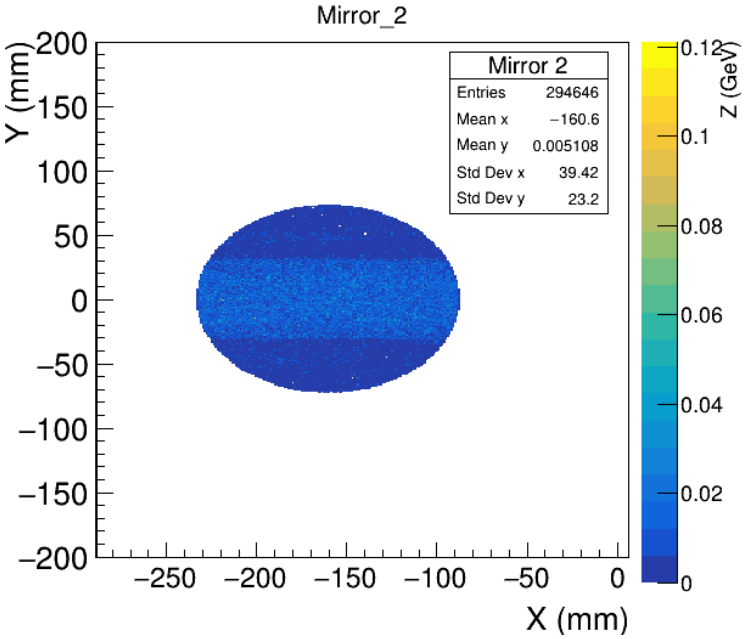
Mirrors

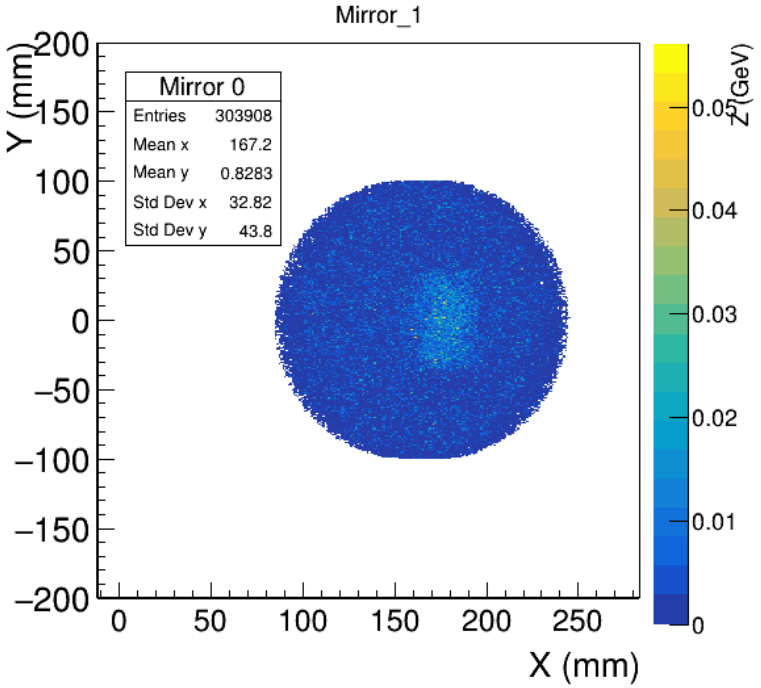


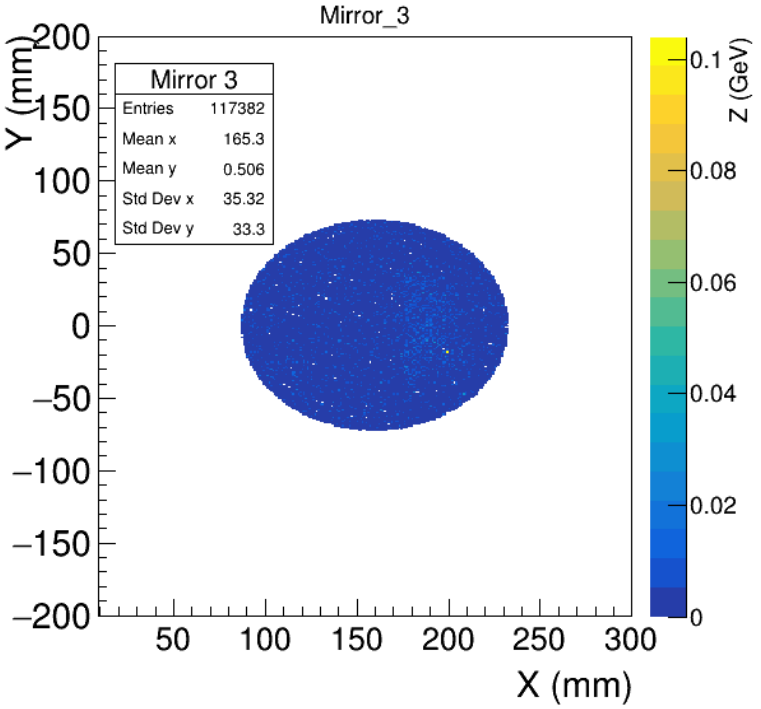


Energy deposited in mirrors per BX per mm2

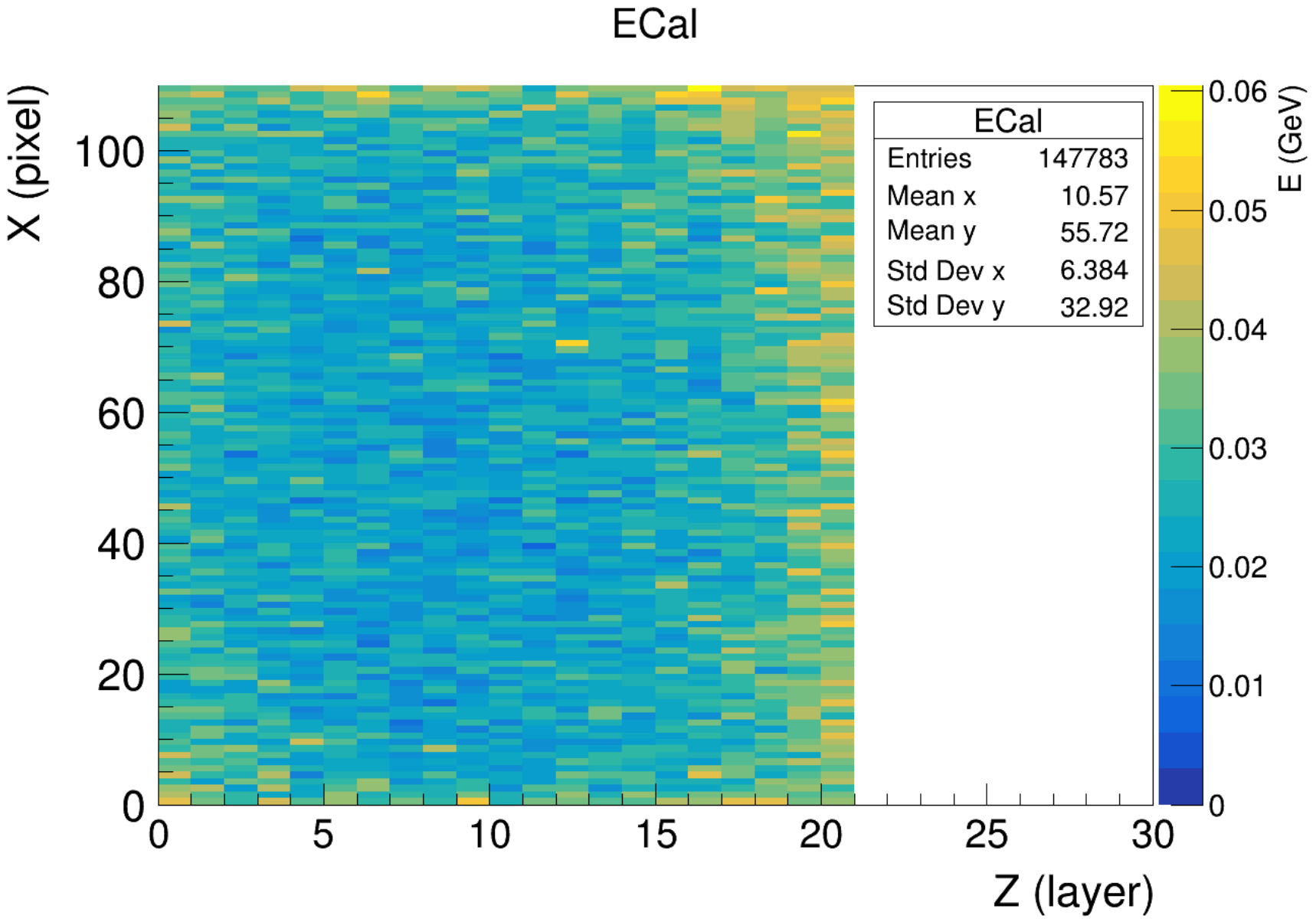






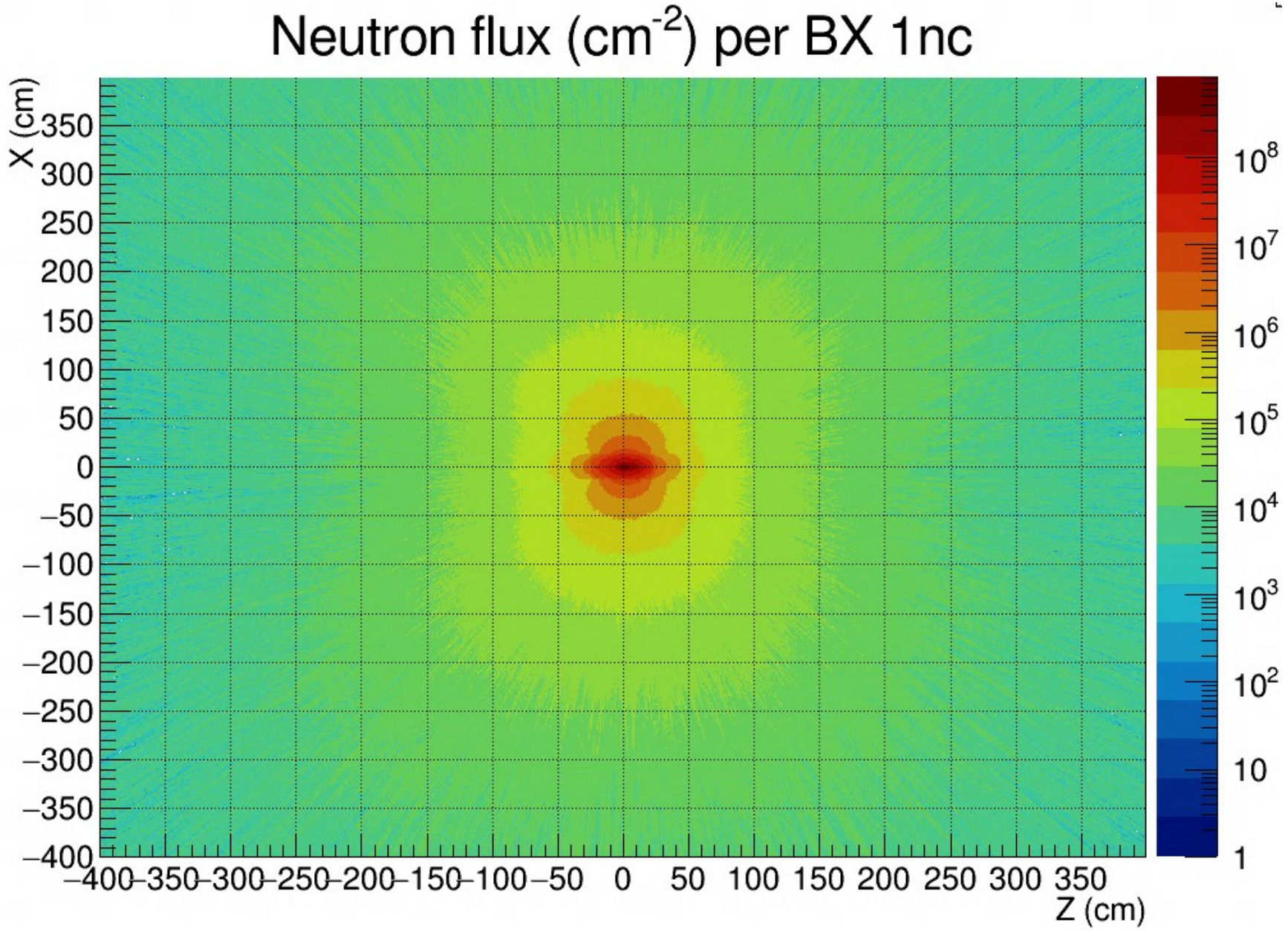


Ecal deposited energy



Neutron fluence map

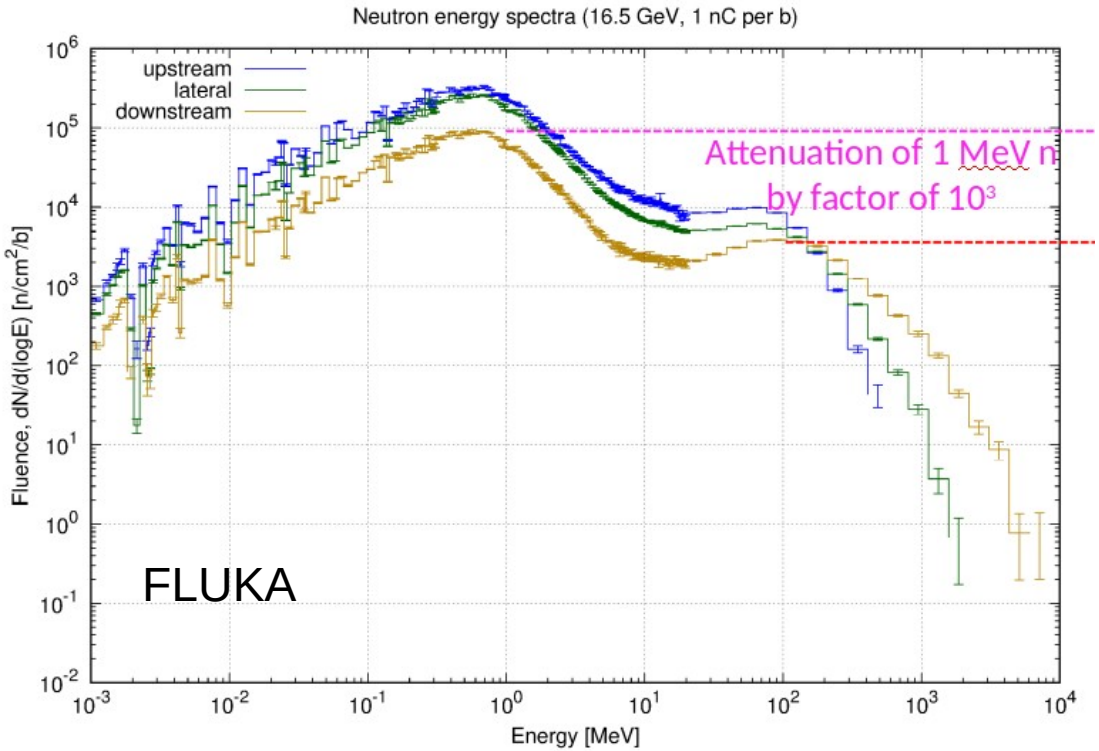
Only beam dump in empty geometry simulated

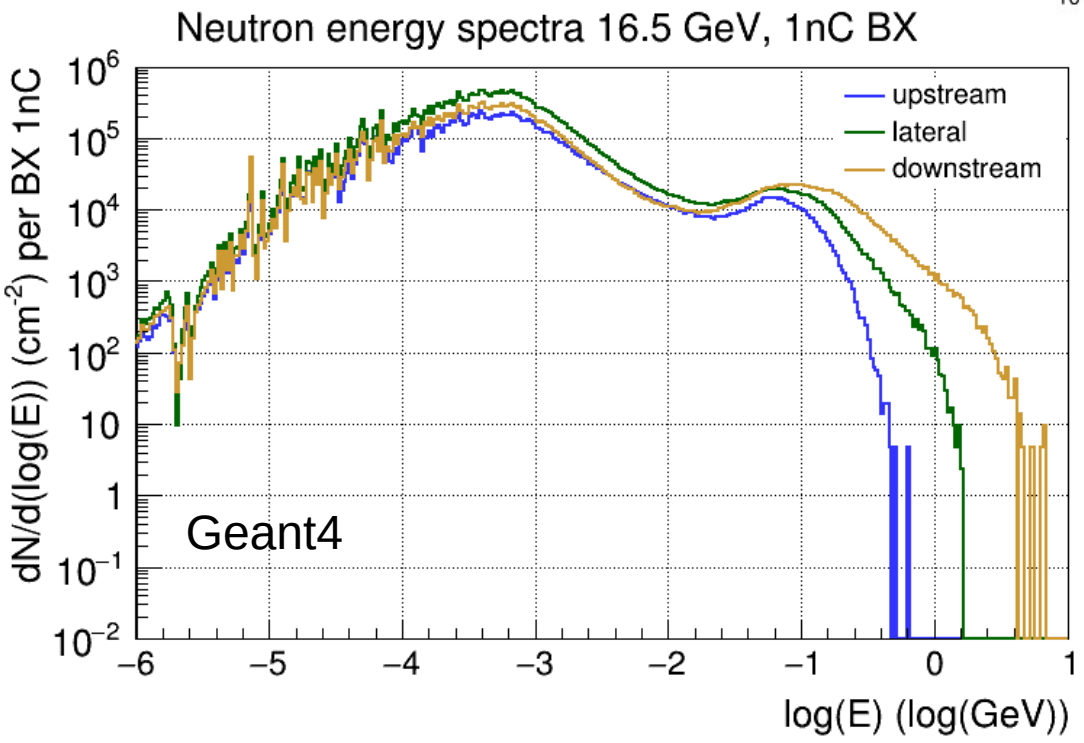


Neutron spectra

Only beam dump in empty geometry simulated

Without Fe + PE shell





Neutron fluence in different distances from the beam dump (z)

Only beam dump in empty geometry simulated