Compact Photon Source Toy Model Studies (continued)

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Radiation Physics Group at RadCon

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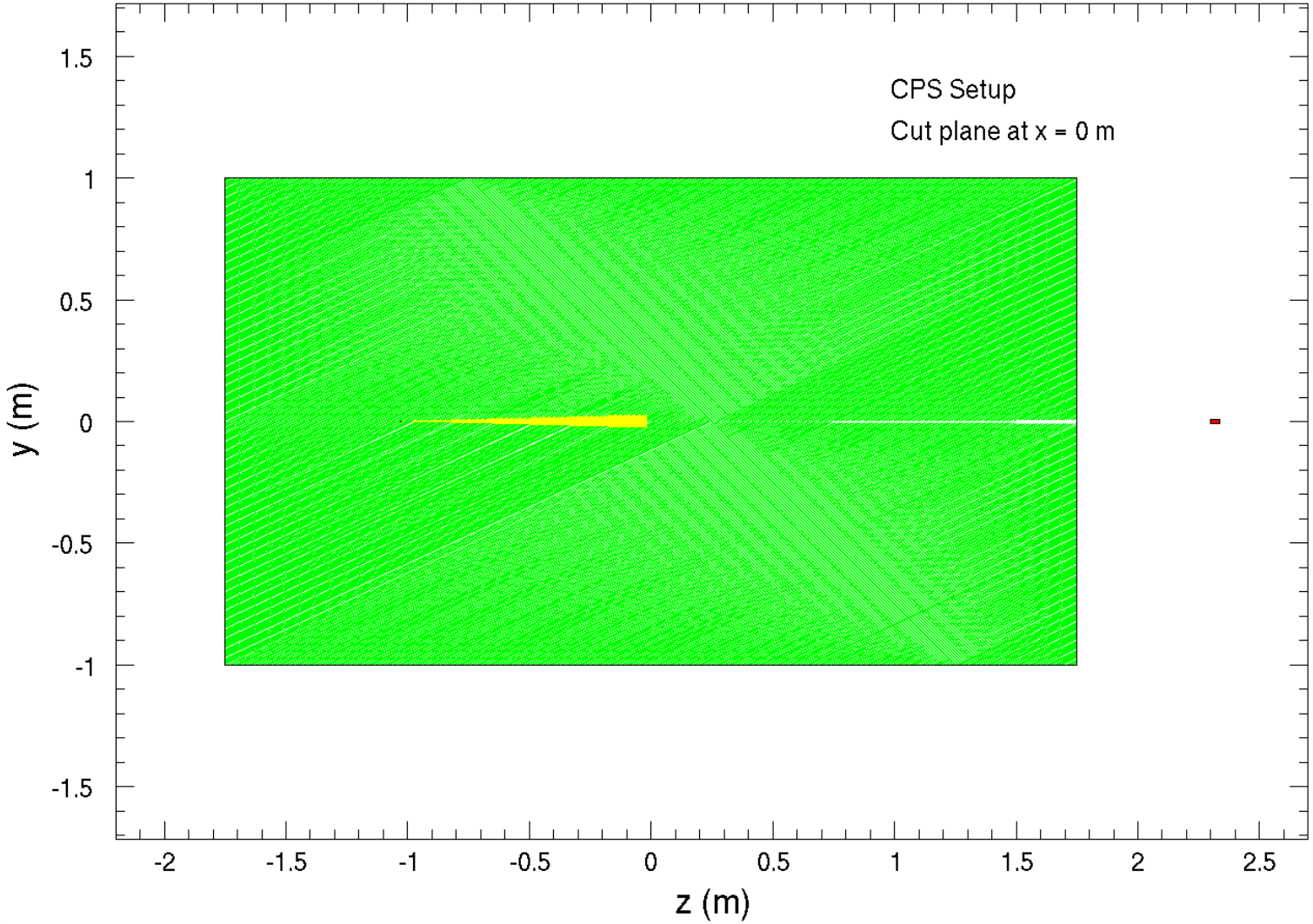
Update of the CPS Toy Model

- Parameterized model in GEANT3/DINREG
  - Cylindrical CPS body (WCu 80%)
  - Beam slit going through
  - Radiator placement inside
  - Magnetic field volume trapezoidal
  - Expanding slit towards the exit
  - Ammonia target placement in photon beam
- Scoring volumes around
  - Side cylinder surface
  - Upstream and downstream disks

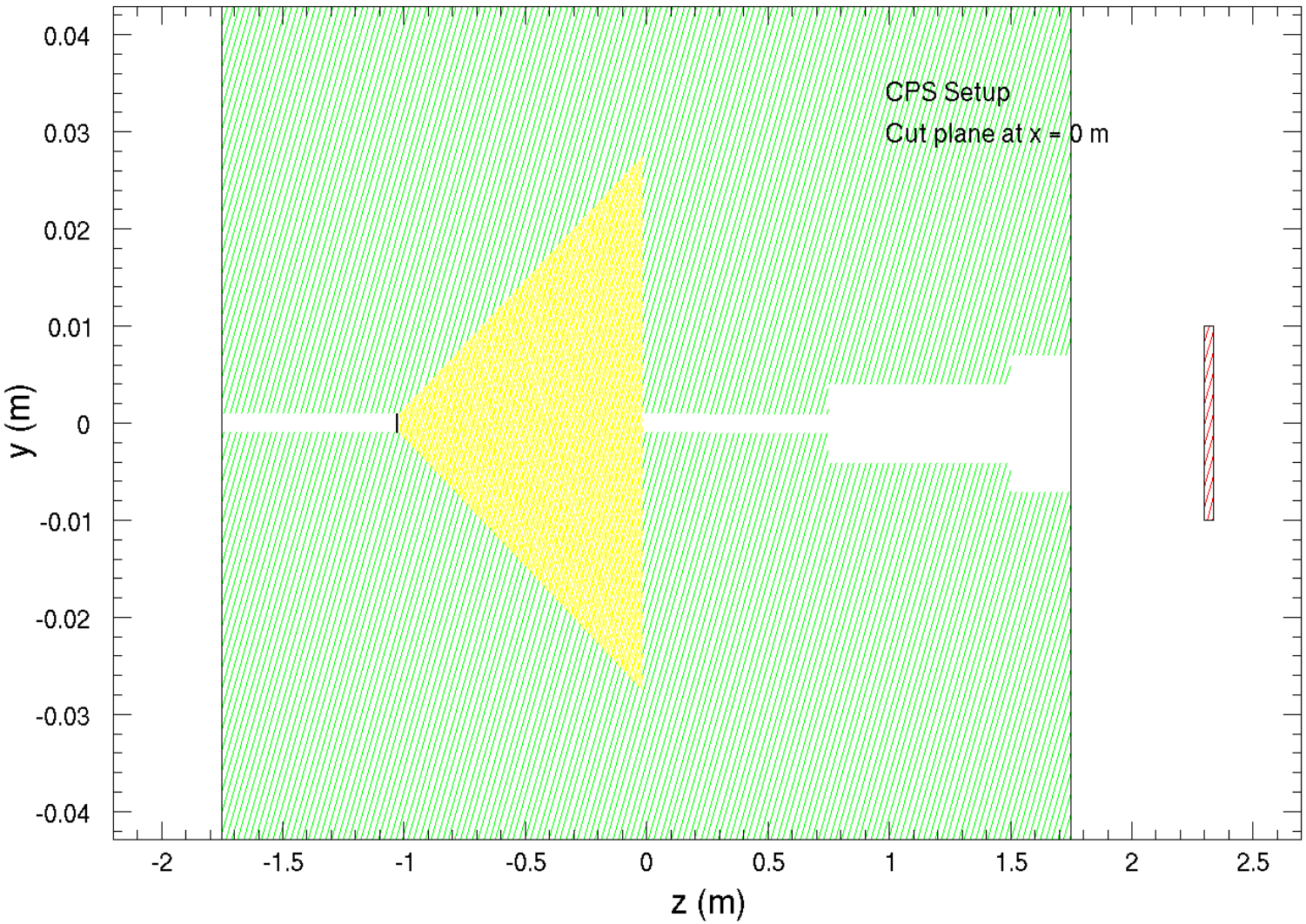
CPS Toy Model

2017/08/25 15.18

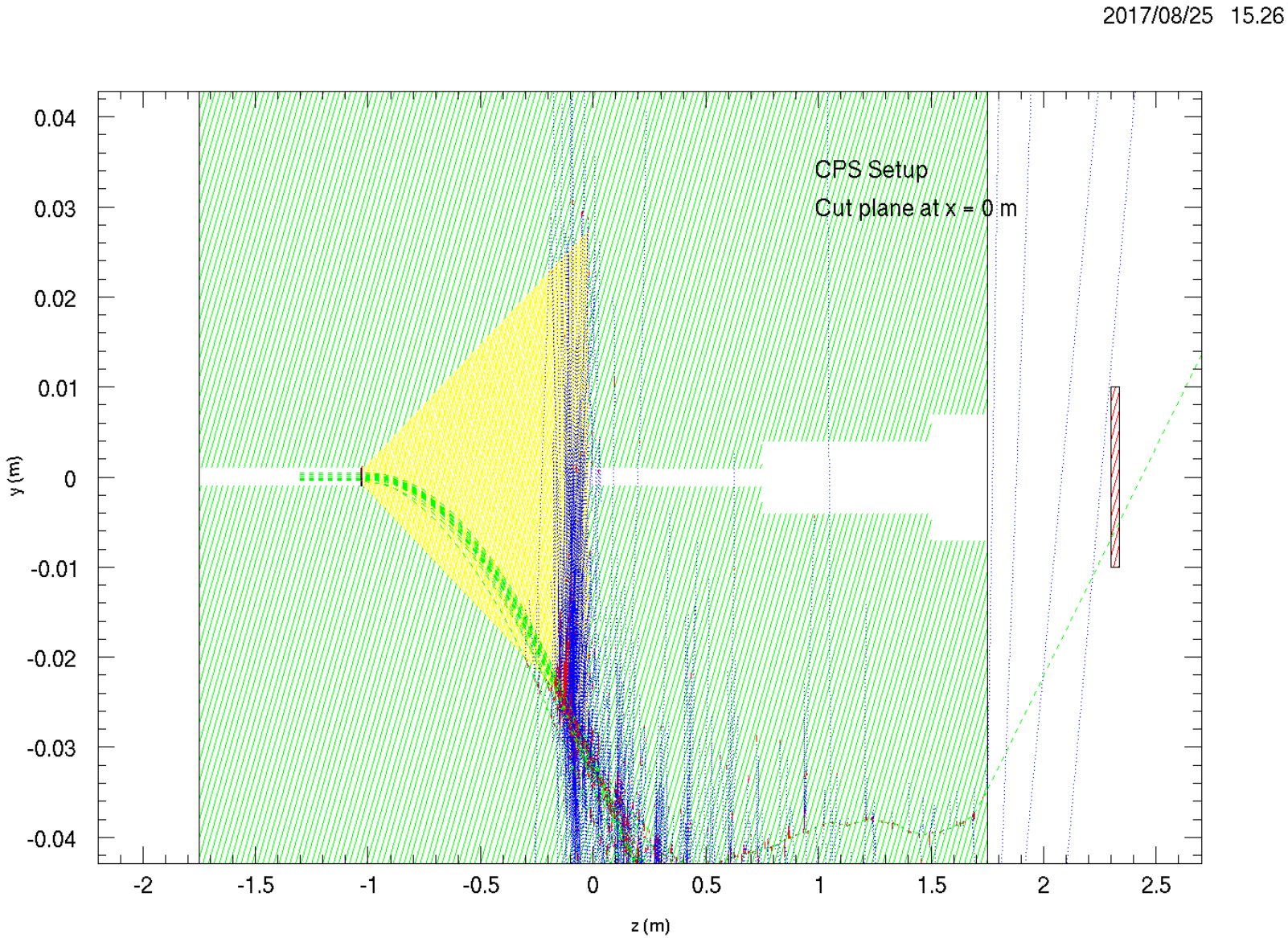


CPS Toy Model Expanded in Y

2017/08/25 15.21

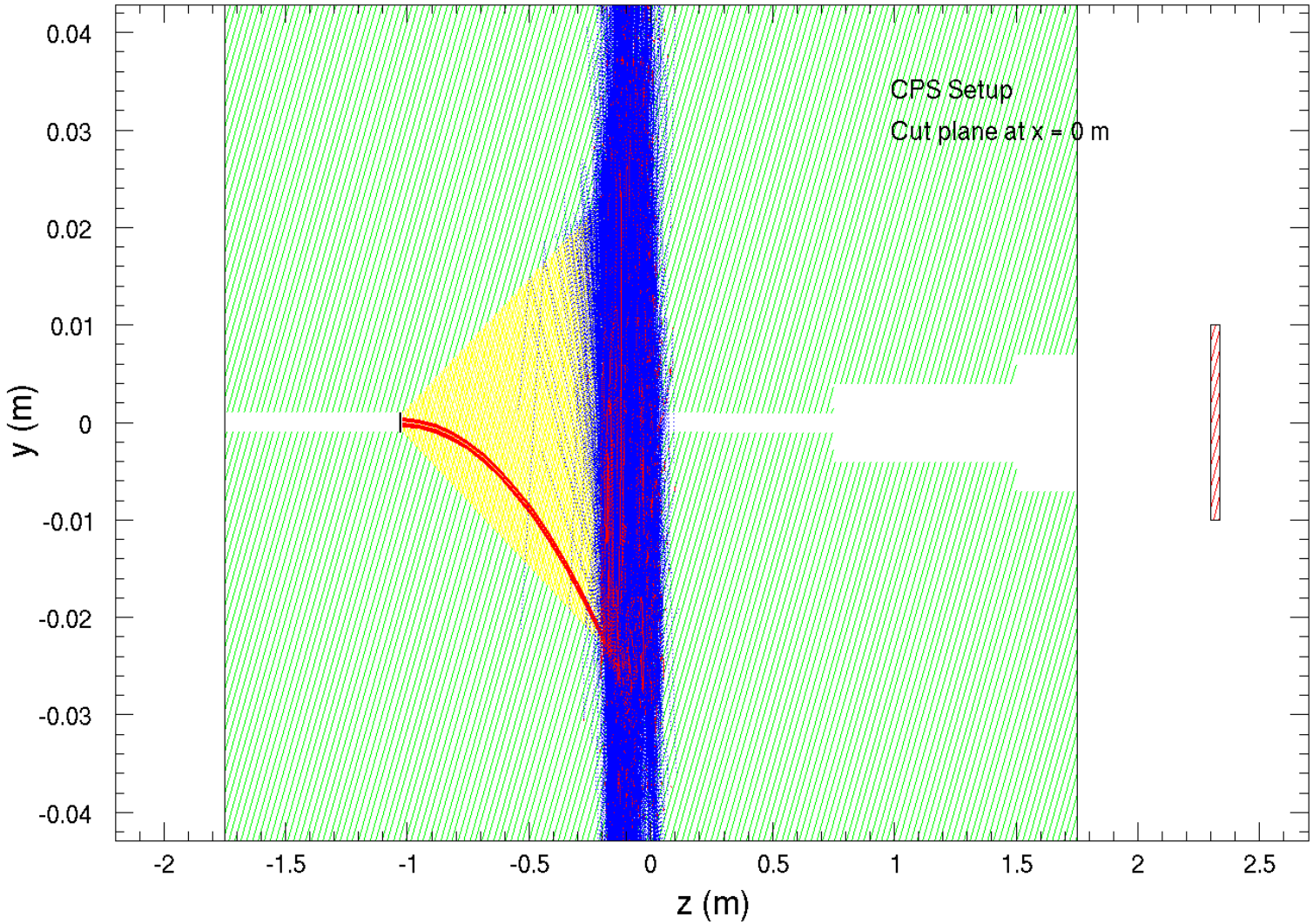


Muons at 11.5 GeV/c



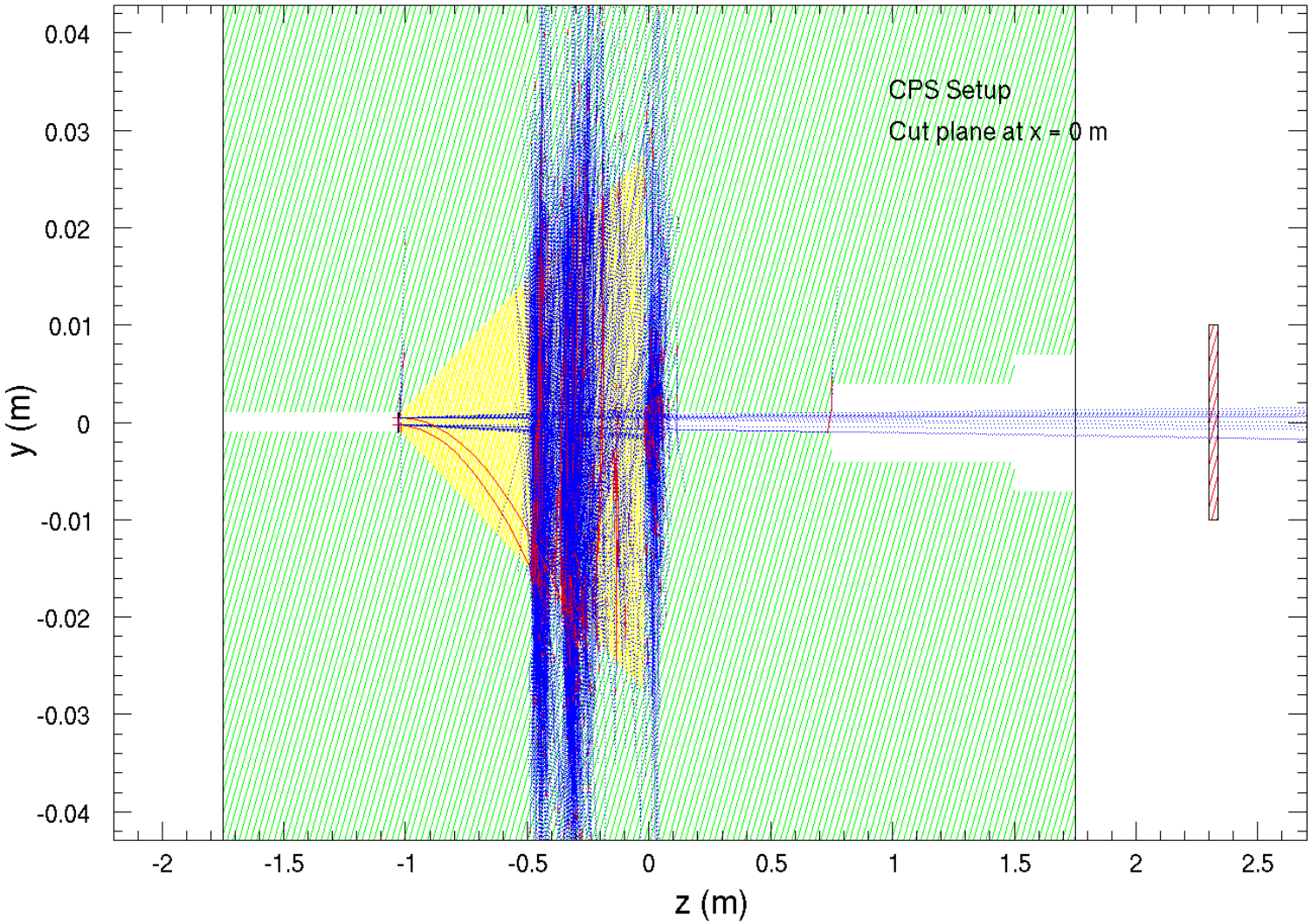
Electrons at 11.5 GeV/c, no Radiator

2017/08/25 15.33



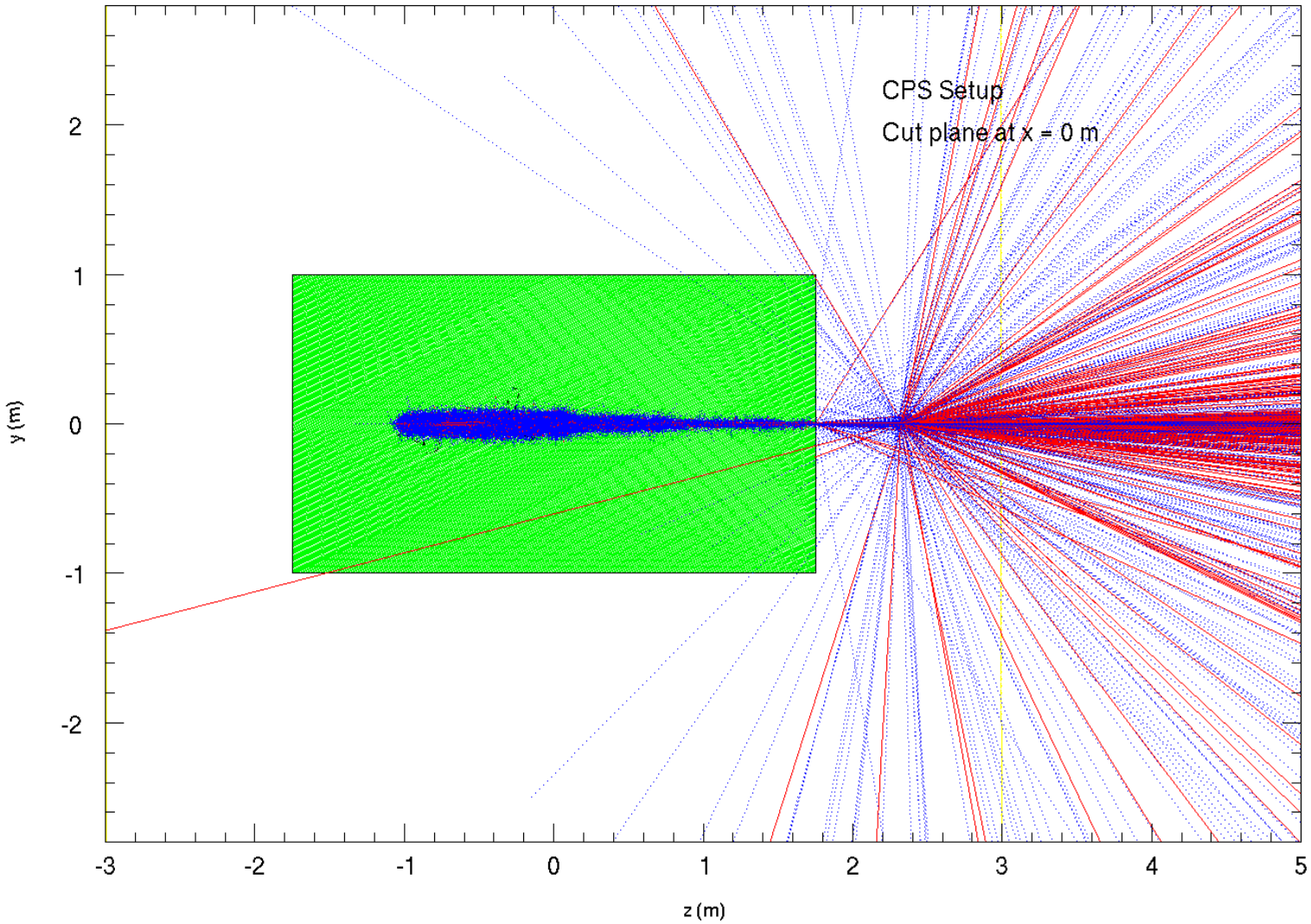
Electrons at 11.5 GeV/c, with Radiator

2017/08/25 15.39



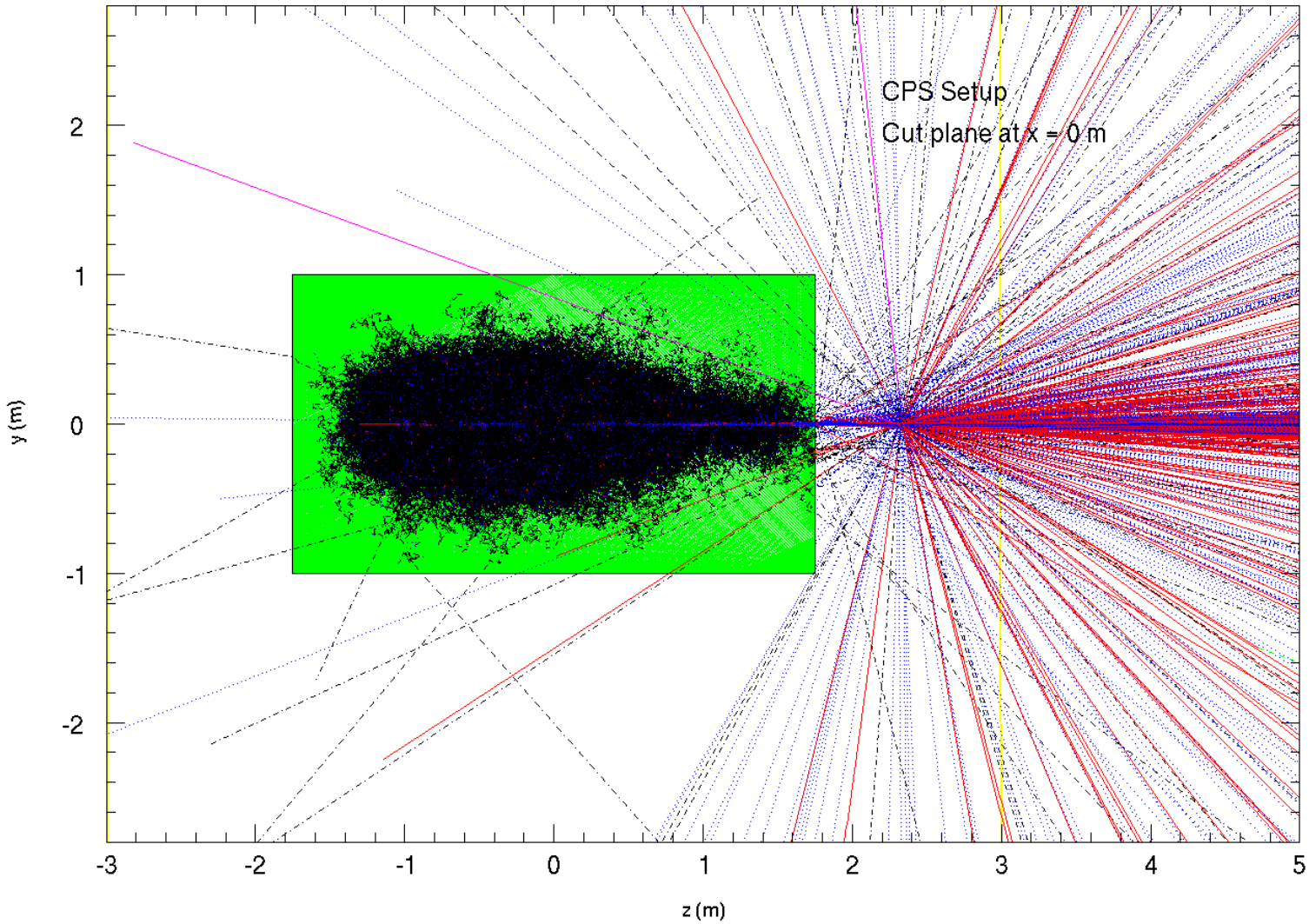
Photon Beam on NH_3 Target, no Neutrons

2017/08/25 15.46

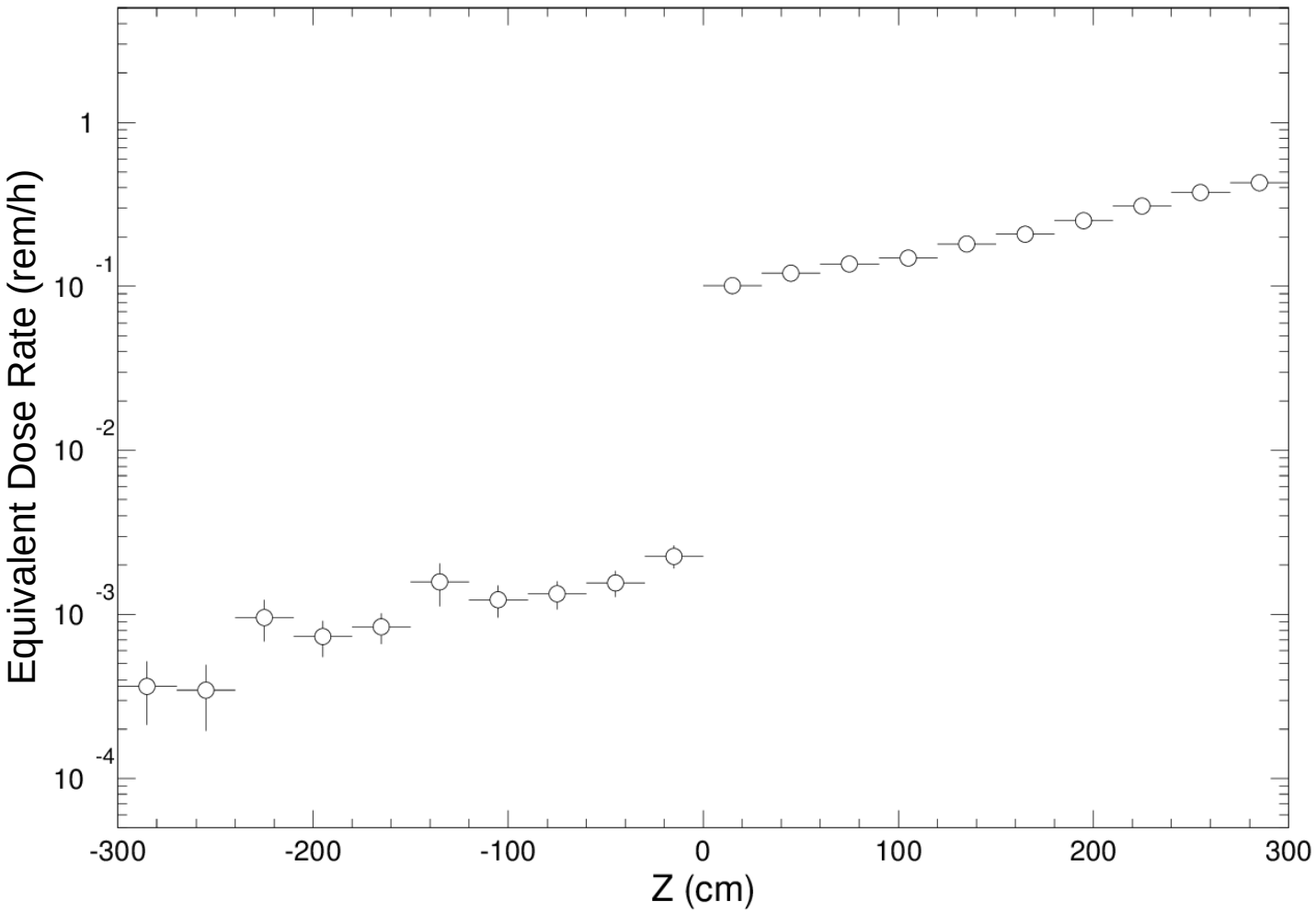


Photon Beam on NH_3, Neutrons Amplified

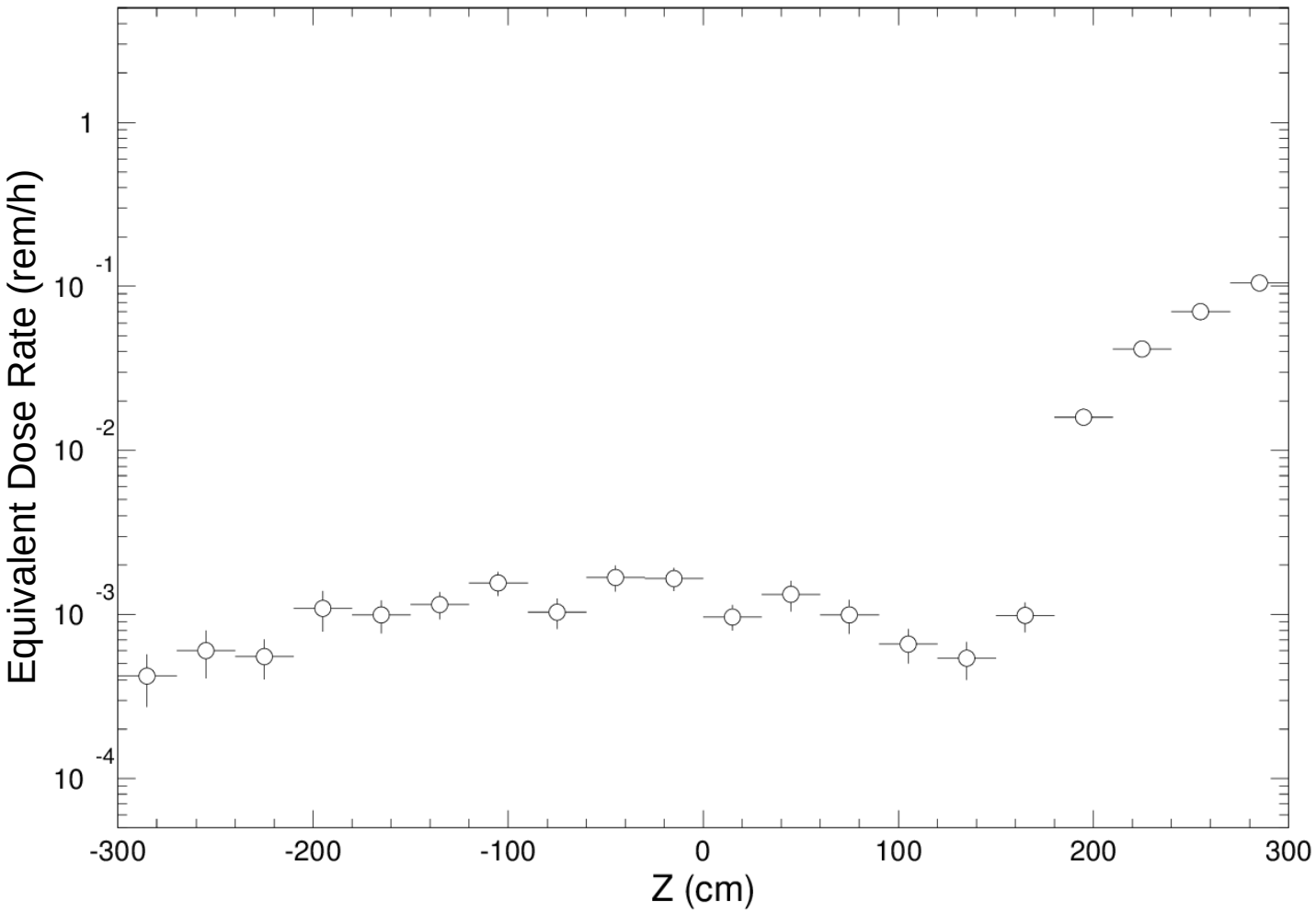
2017/08/25 15.09



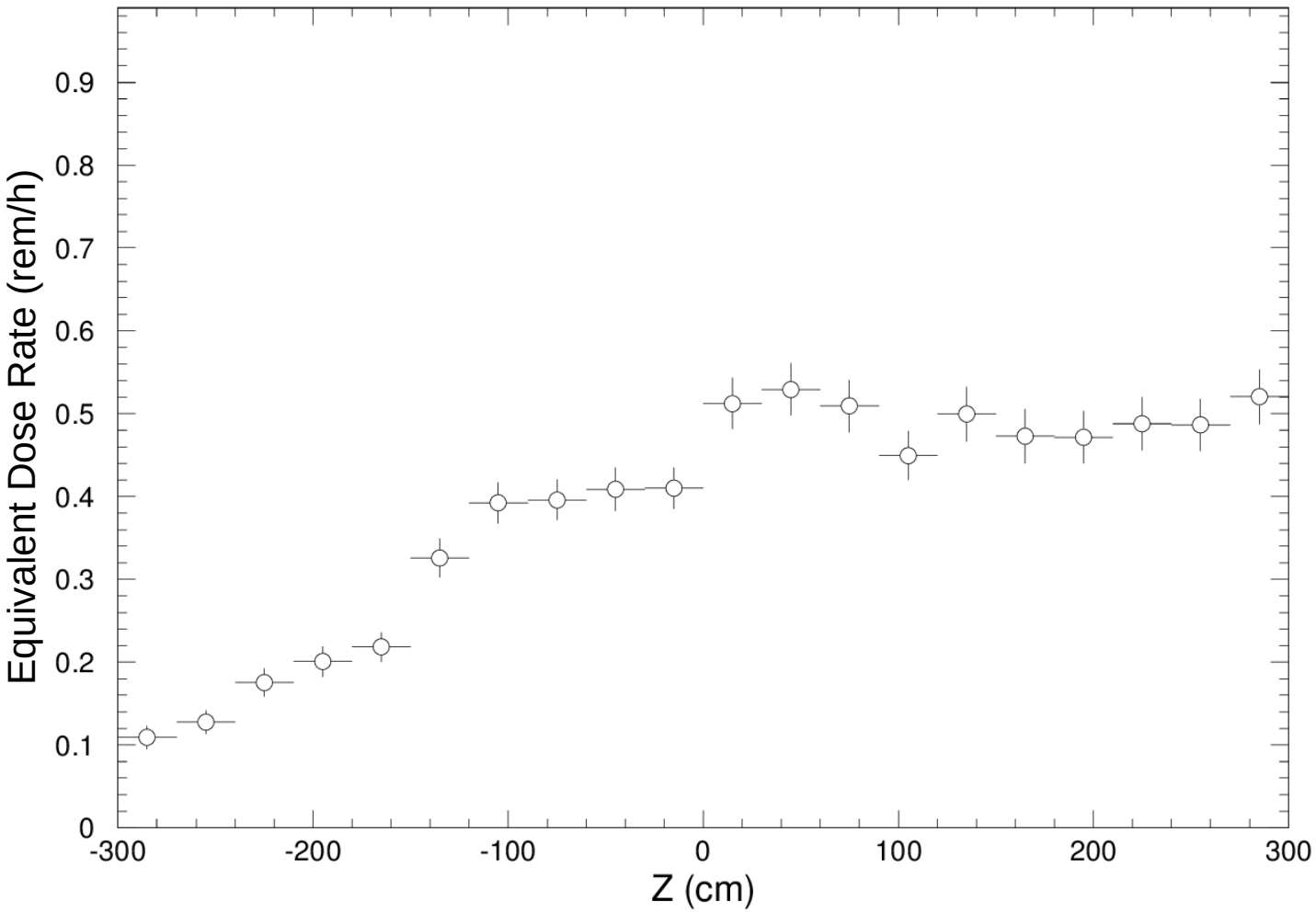
Photon Dose Rate at the Side, NH_3 Target



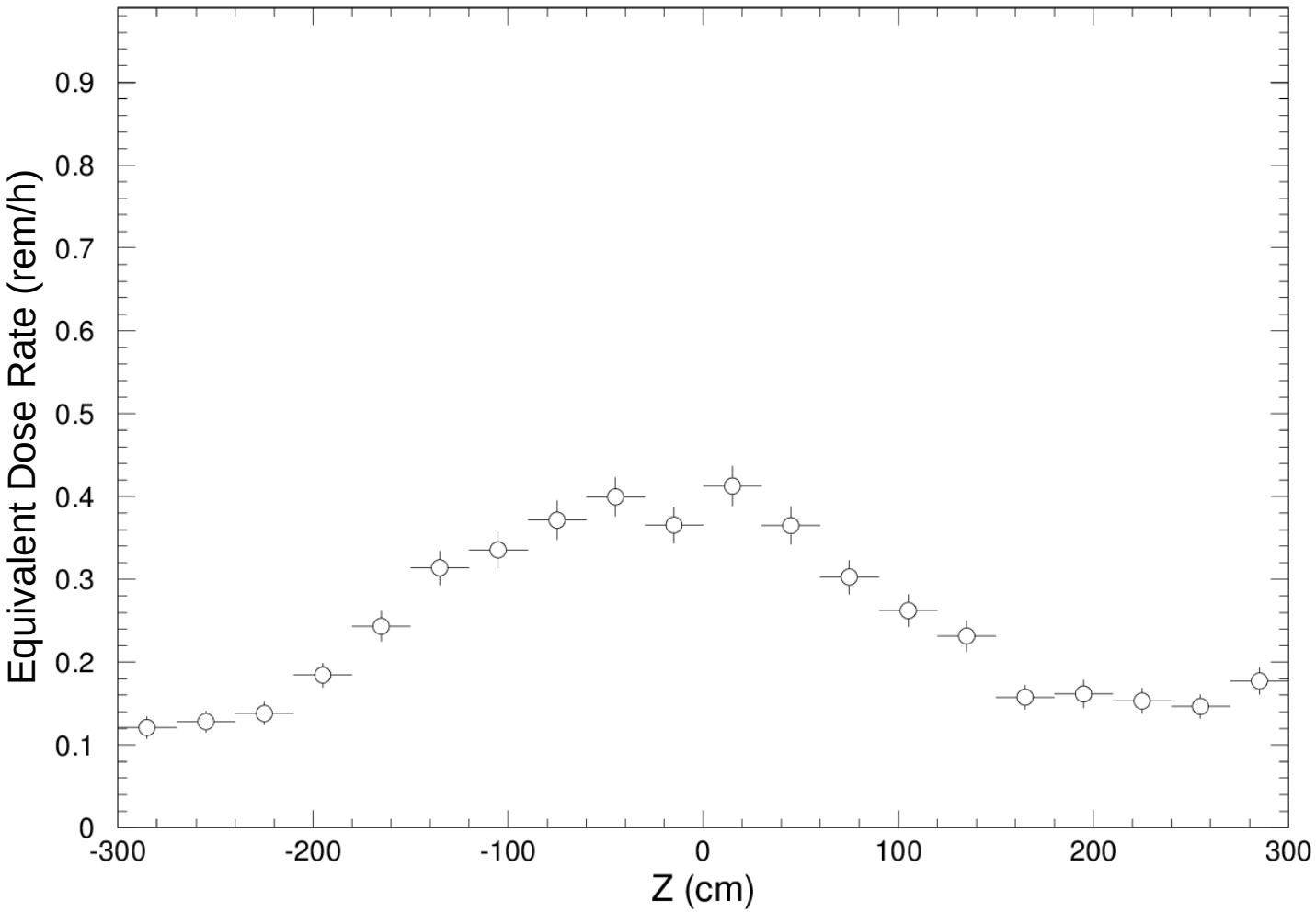
Photon Dose Rate at the Side, no Target



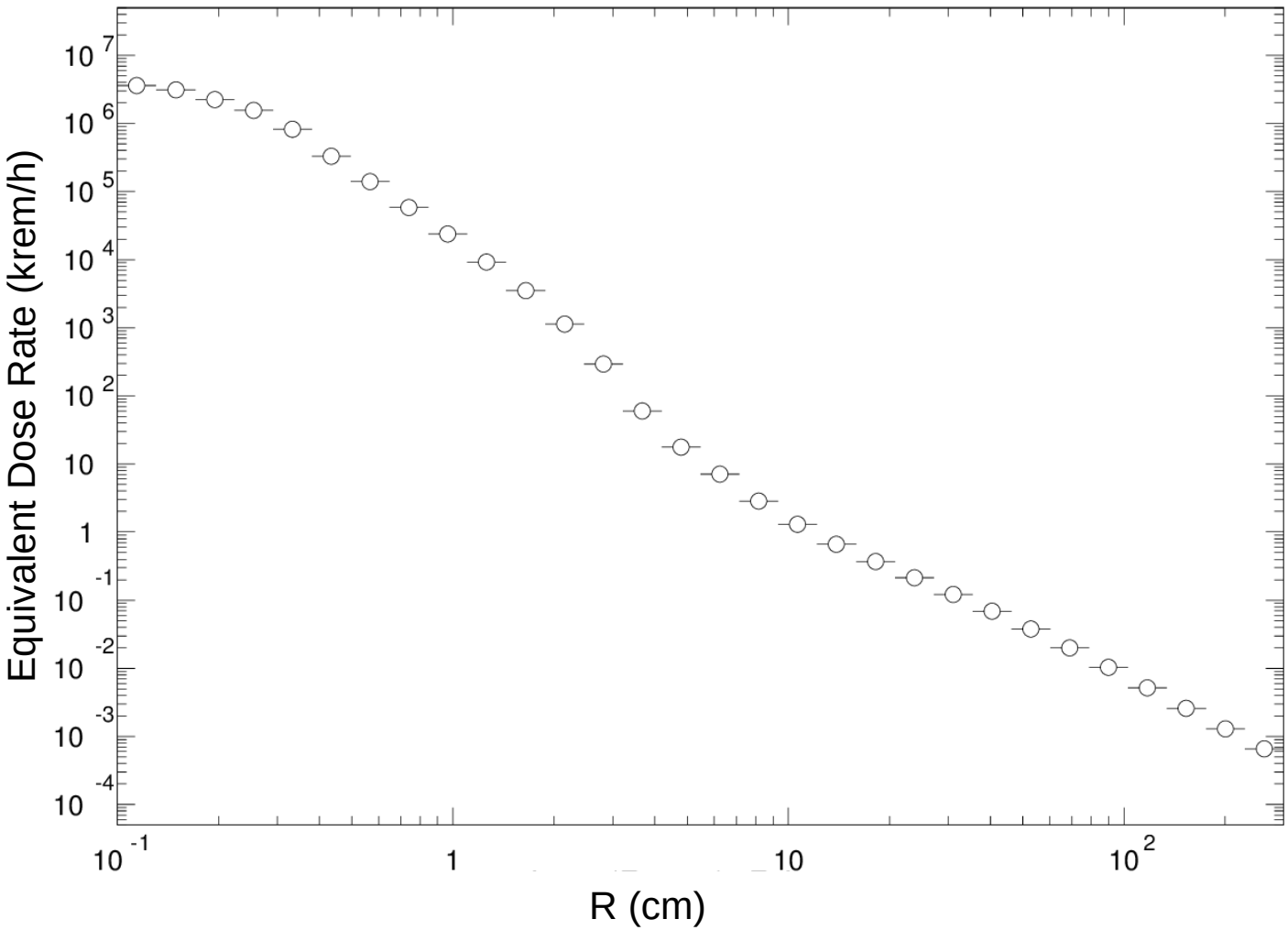
Neutron Dose Rate at the Side, NH_3 Target



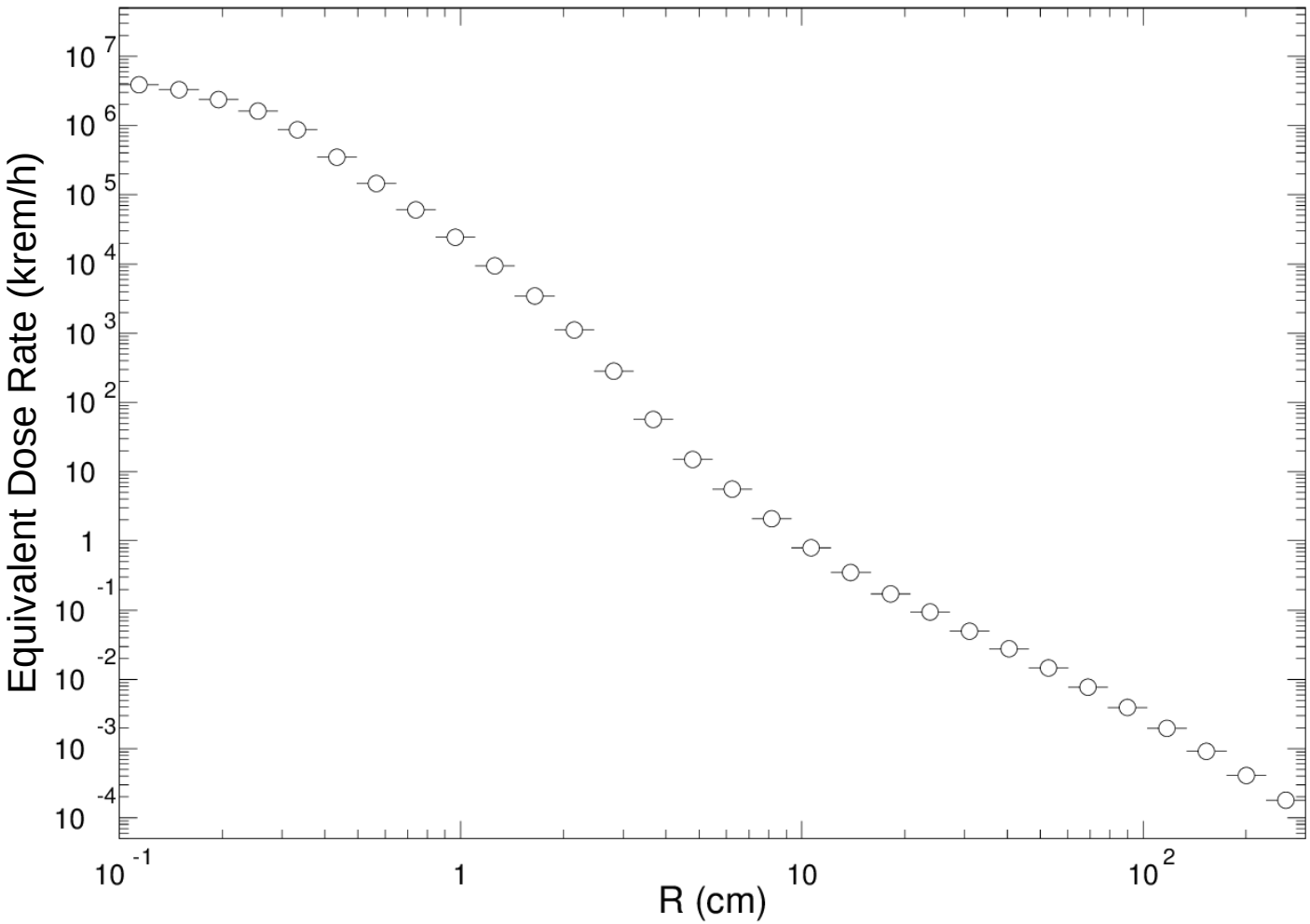
Neutron Dose Rate at the Side, no Target



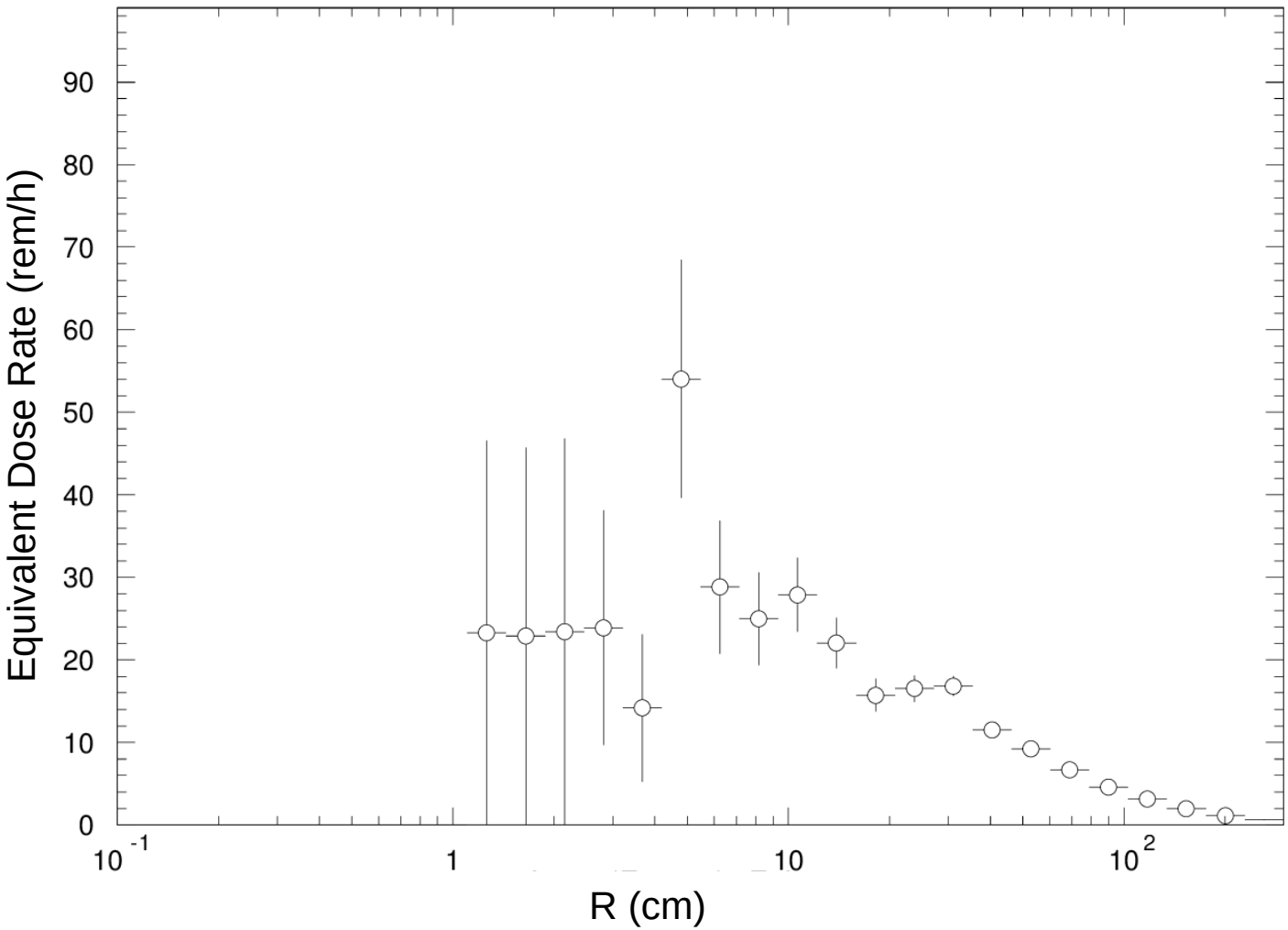
Photon Dose Rate Forward, NH_3 Target



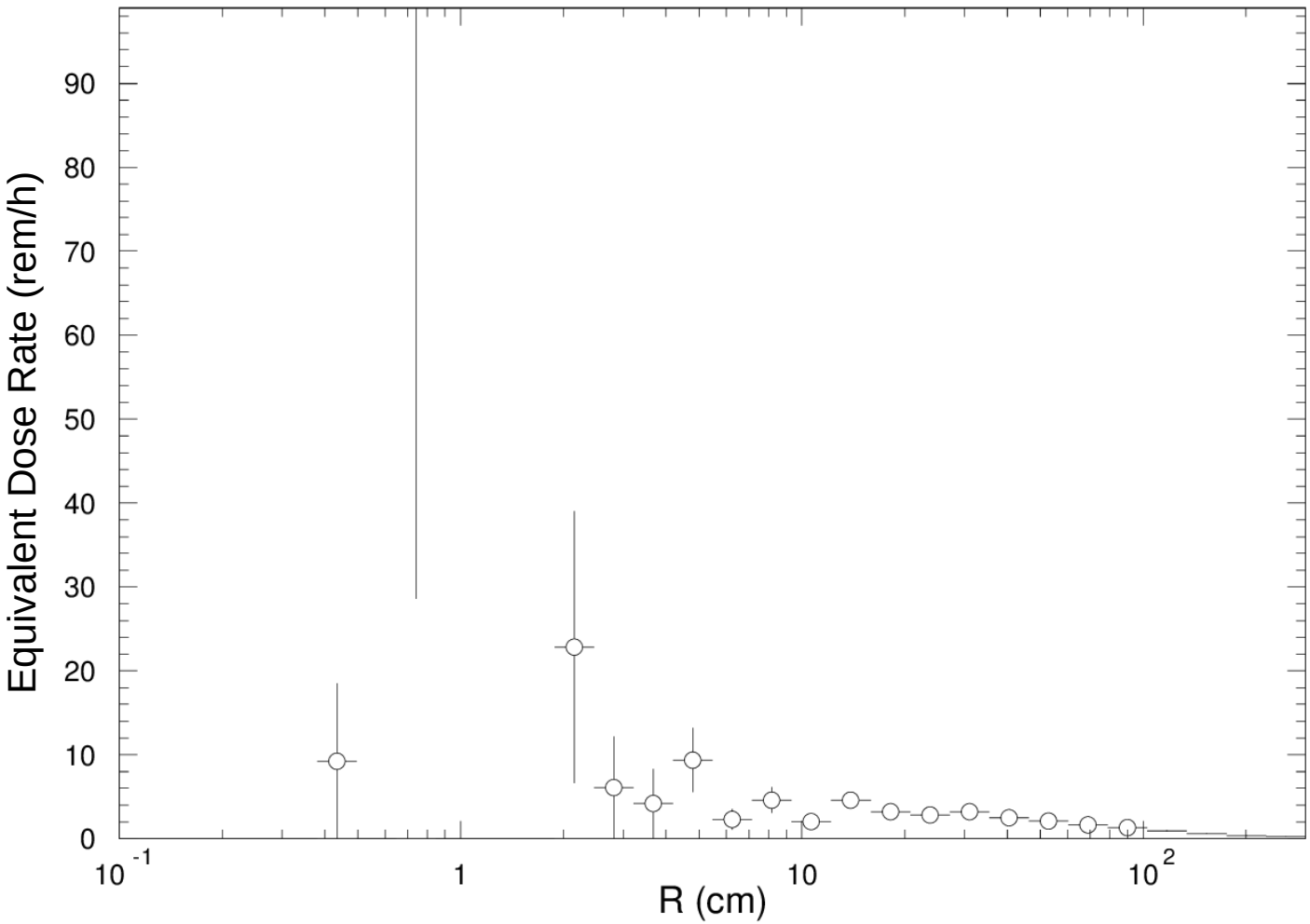
Photon Dose Rate Forward, no Target



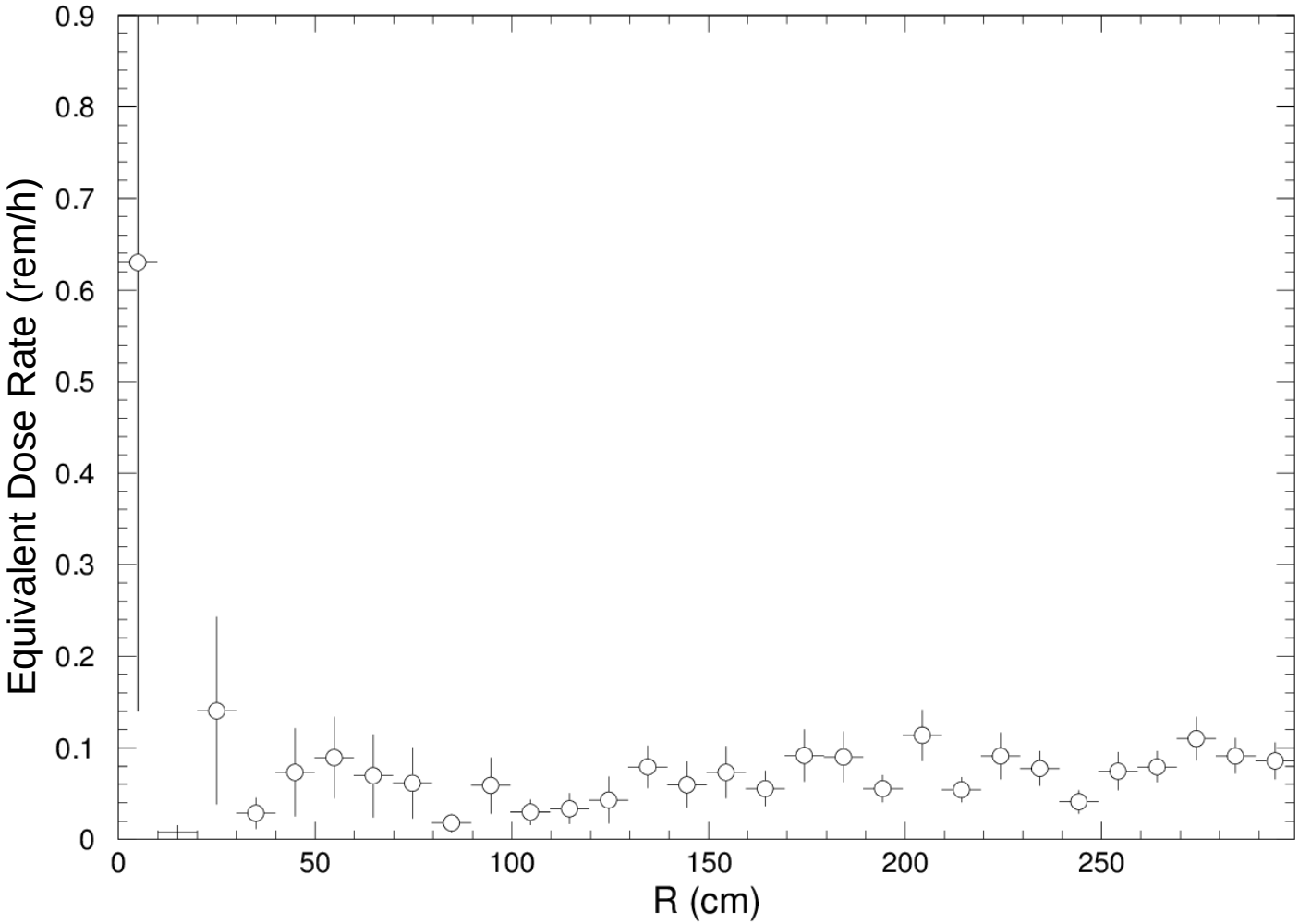
Neutron Dose Rate Forward, NH_3 Target



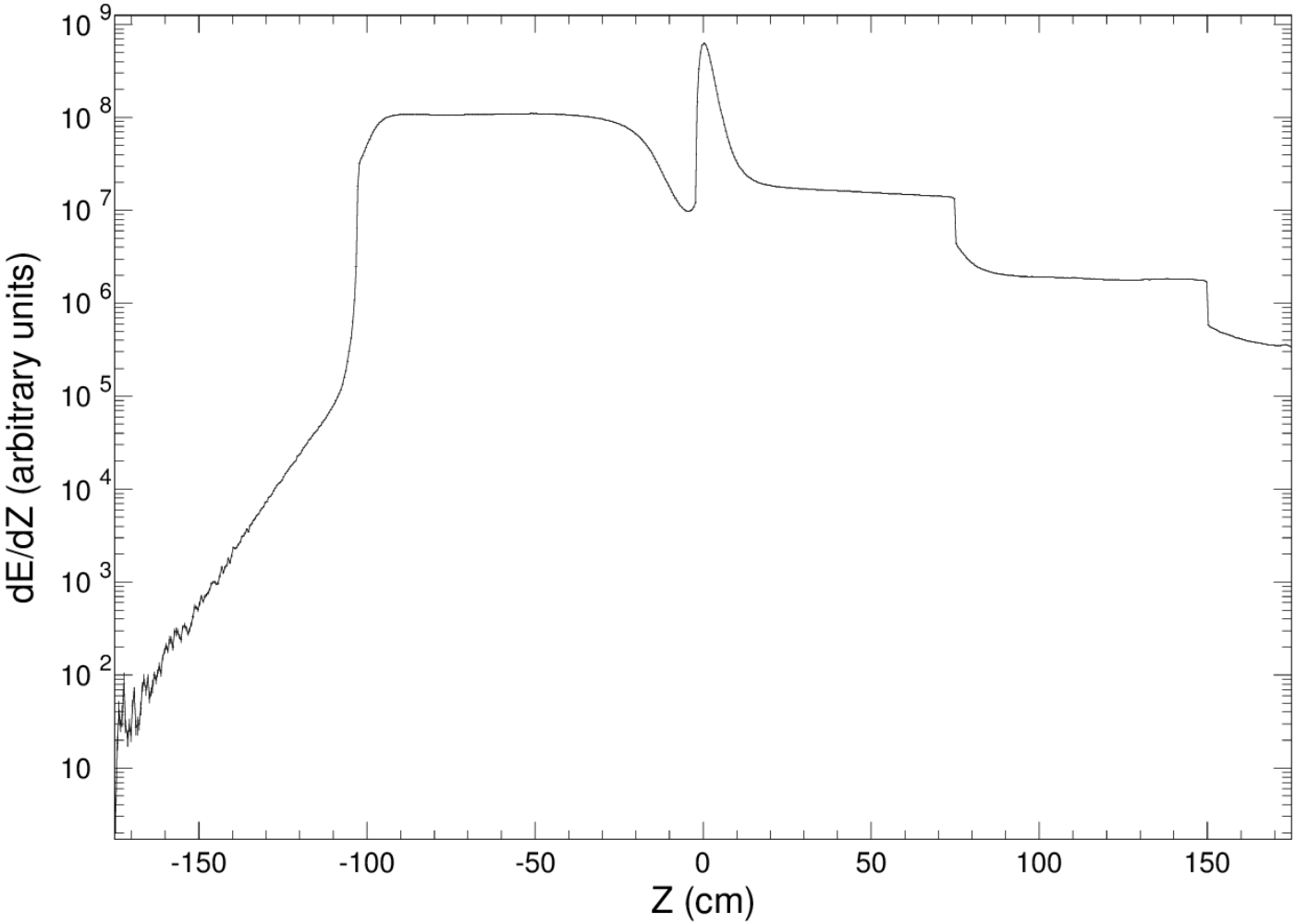
Neutron Dose Rate Forward, no Target



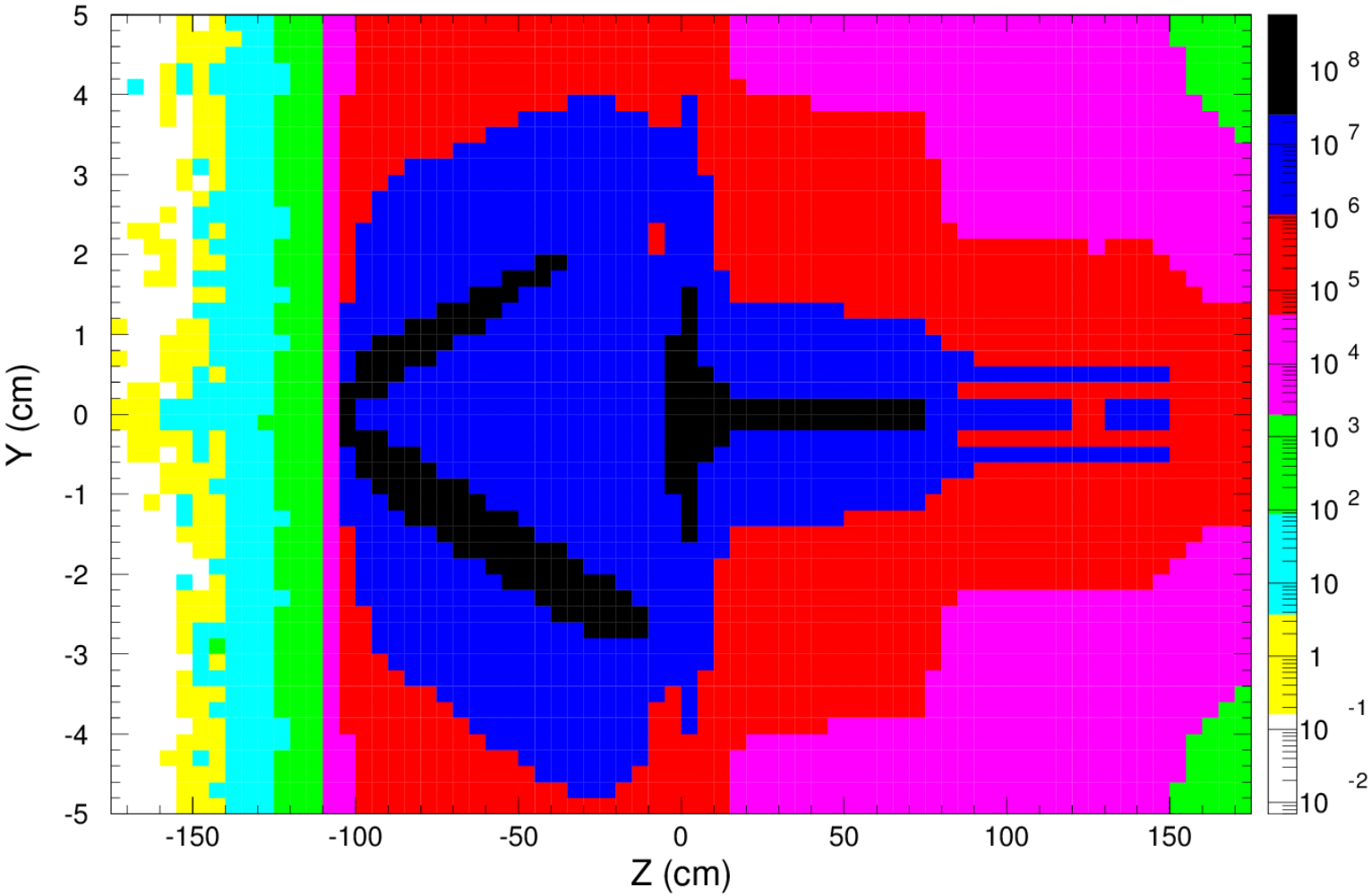
Neutron Dose Rate Backward, no Target



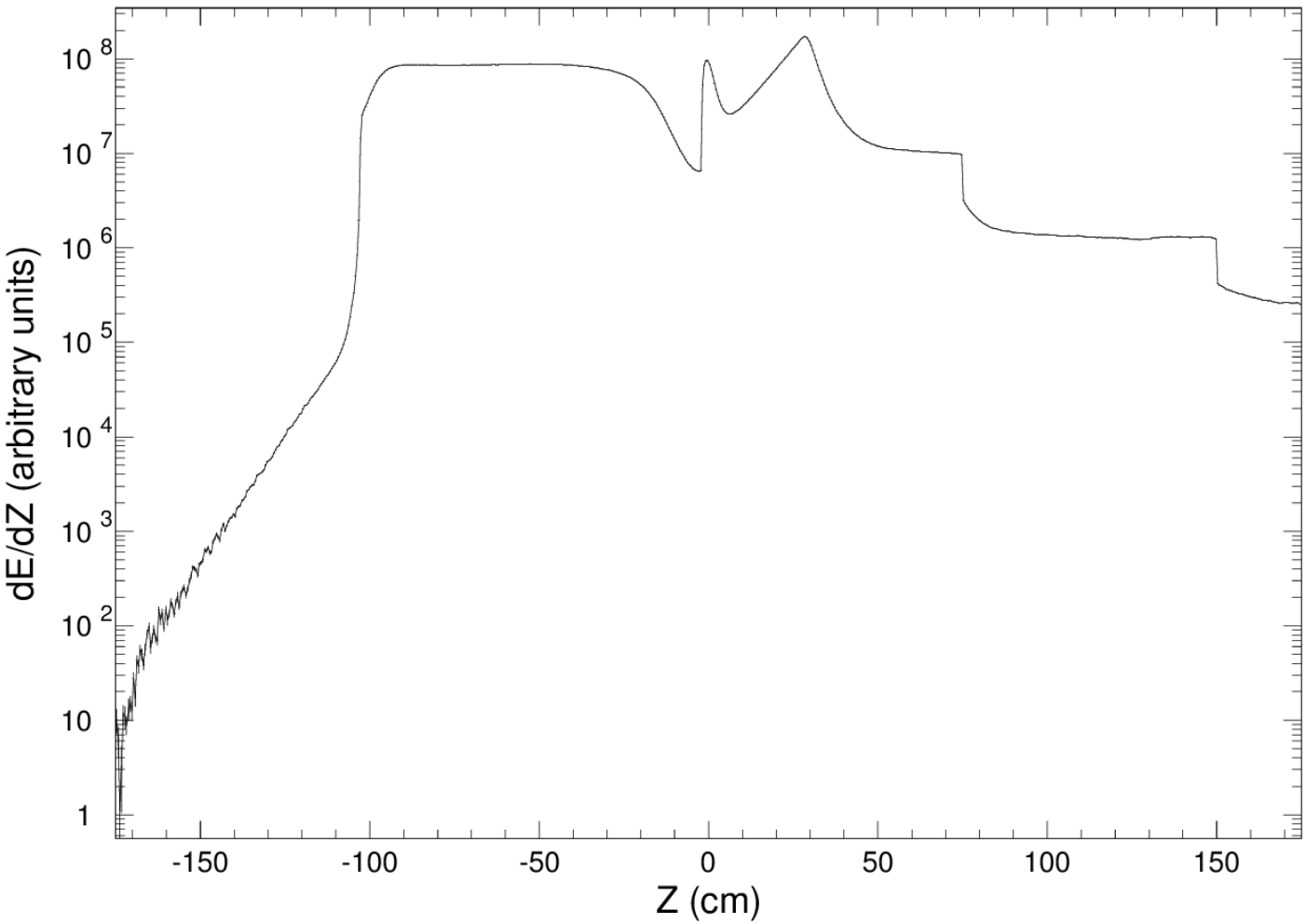
Power Distribution Inside the CPS Core



Power Density Distribution Inside



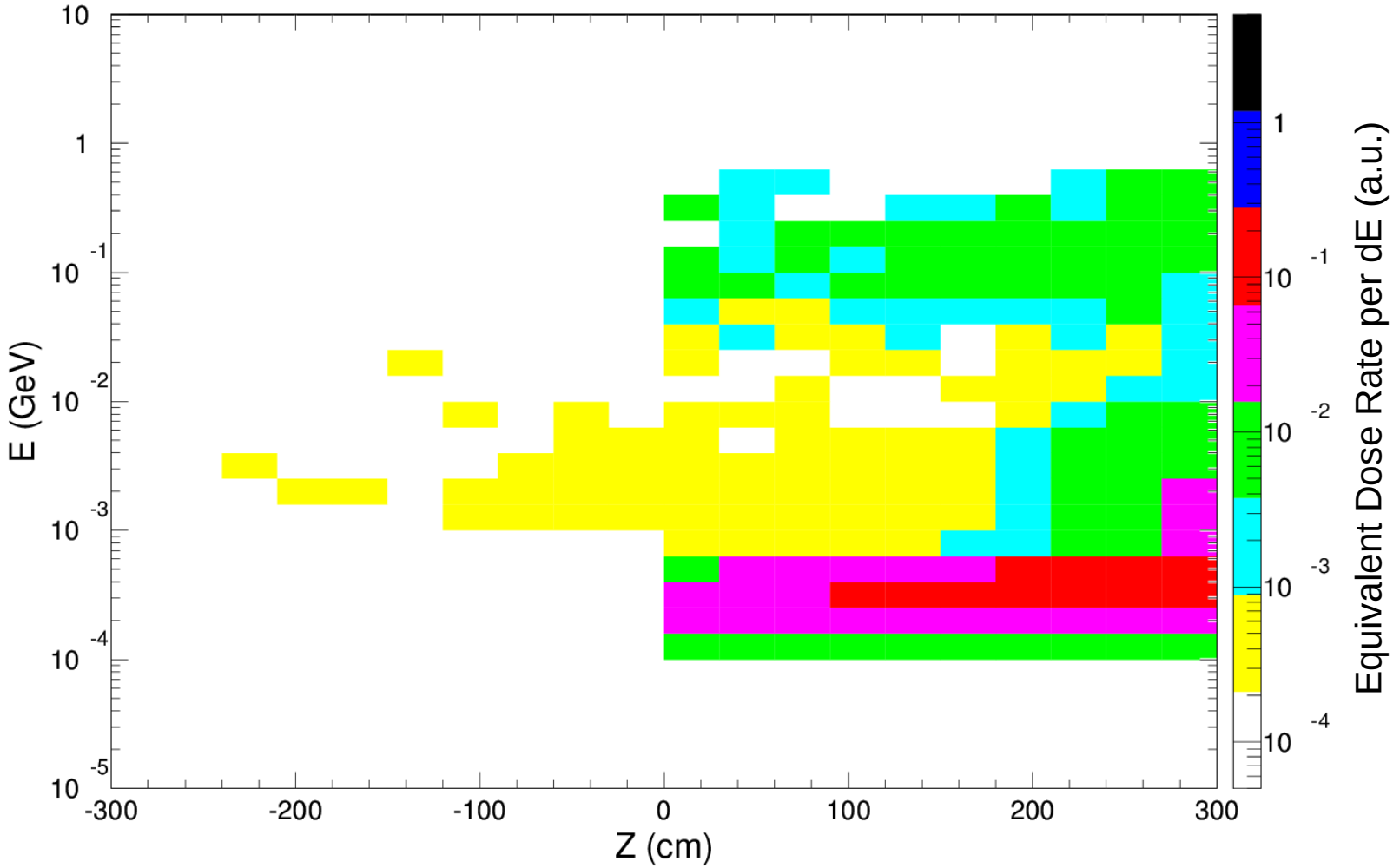
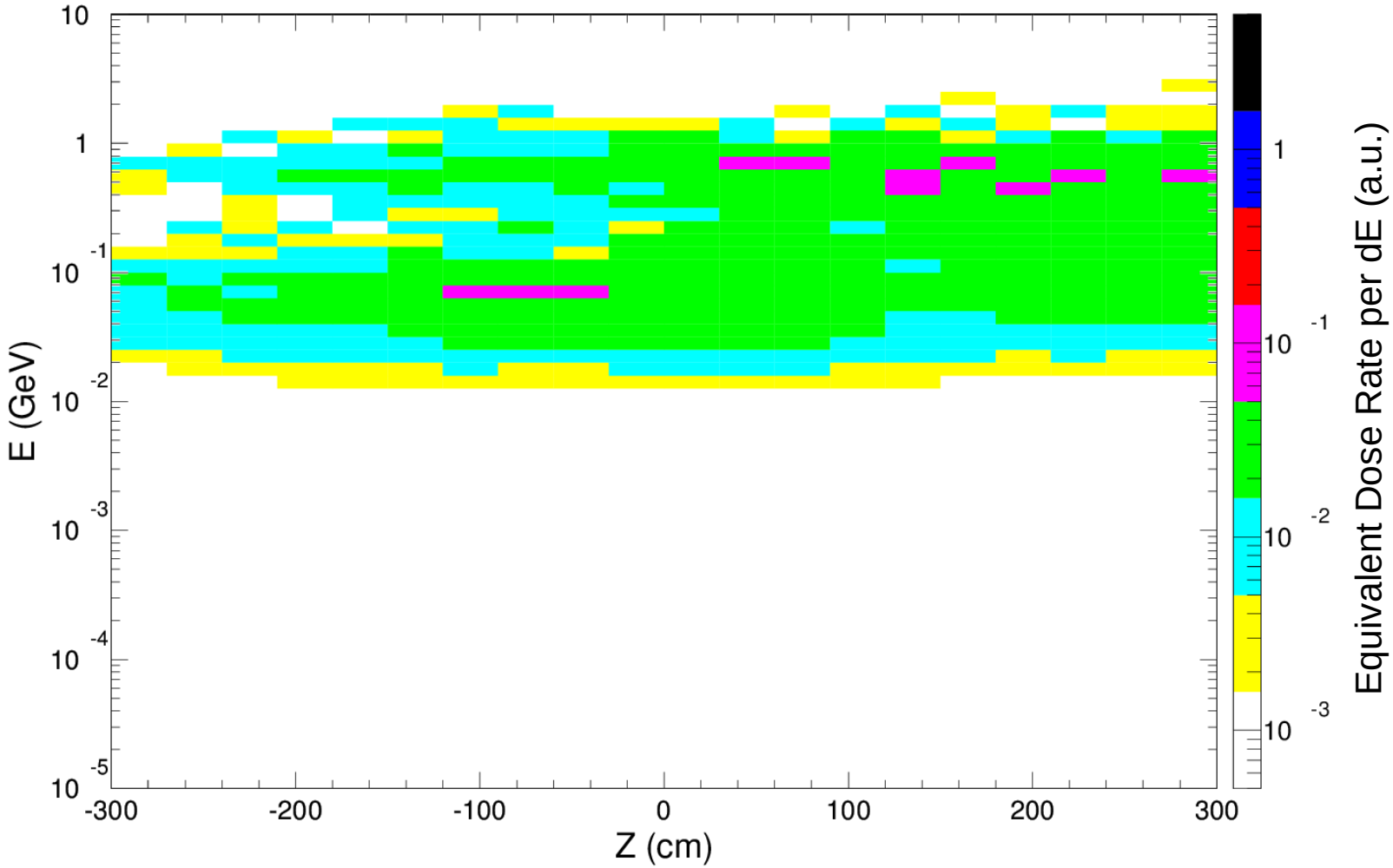
Power Distribution Density Optimization



Conclusions

- Parameterized “ToyCPS-2” model available
- Wedge-shaped magnetic field volume helps
- Satisfactory shielding performance
- Satisfactory thermal load performance
- Conditions for more detailed optimized design

Photon Dose Rate at the Side, NH_3 Target



Neutron Dose Rate at the Side, NH_3 Target