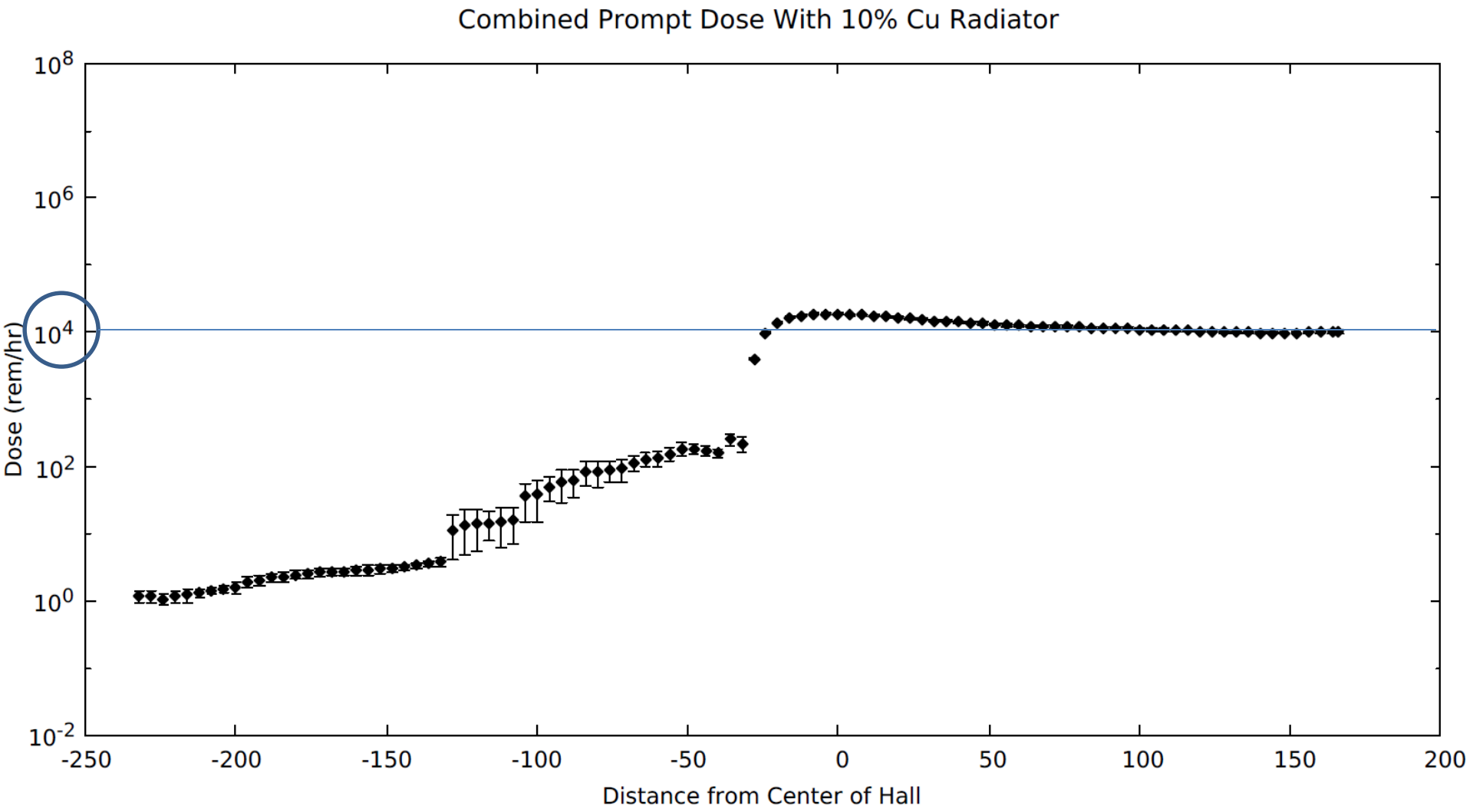
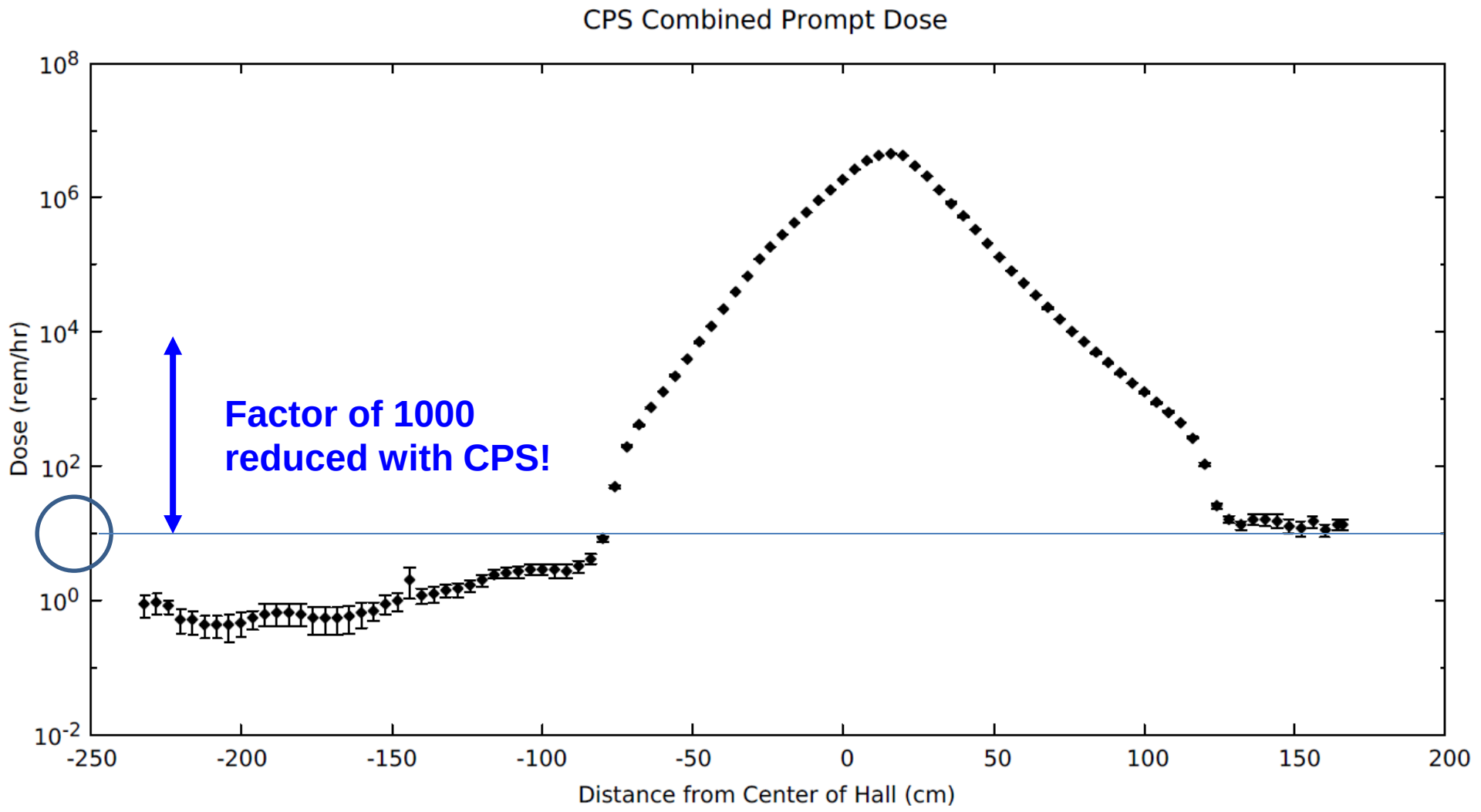
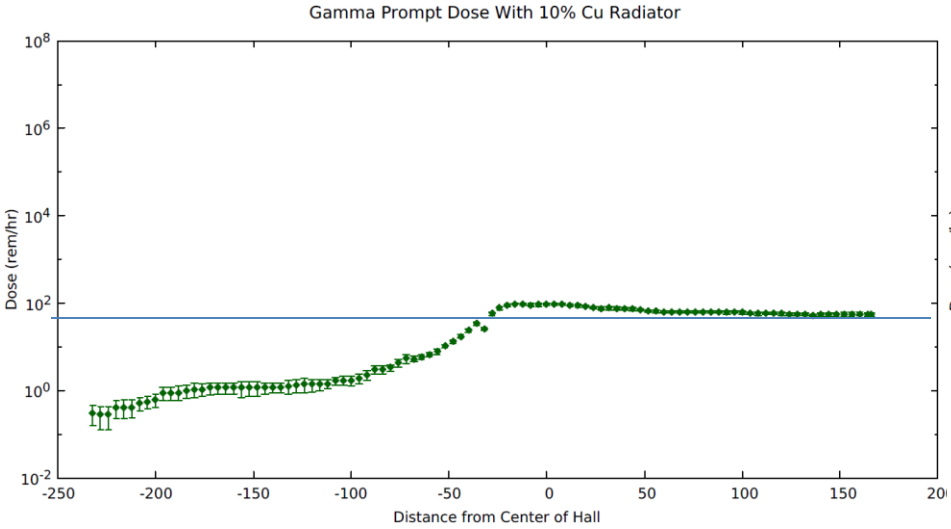
Prompt dose: 11 GeV, 2.7 μA, 10% Cu radiator

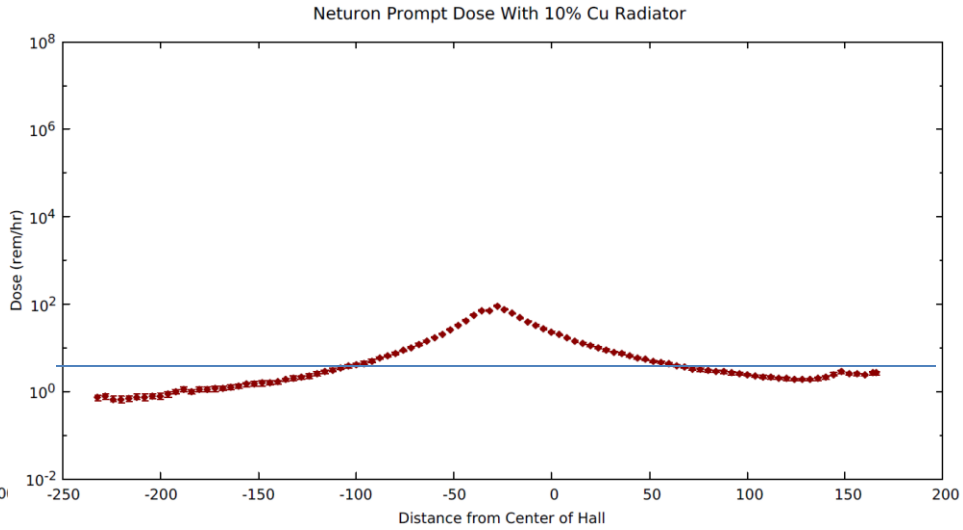


Prompt dose: 11 GeV, 2.7 μA, 10% Cu radiator **with CPS**

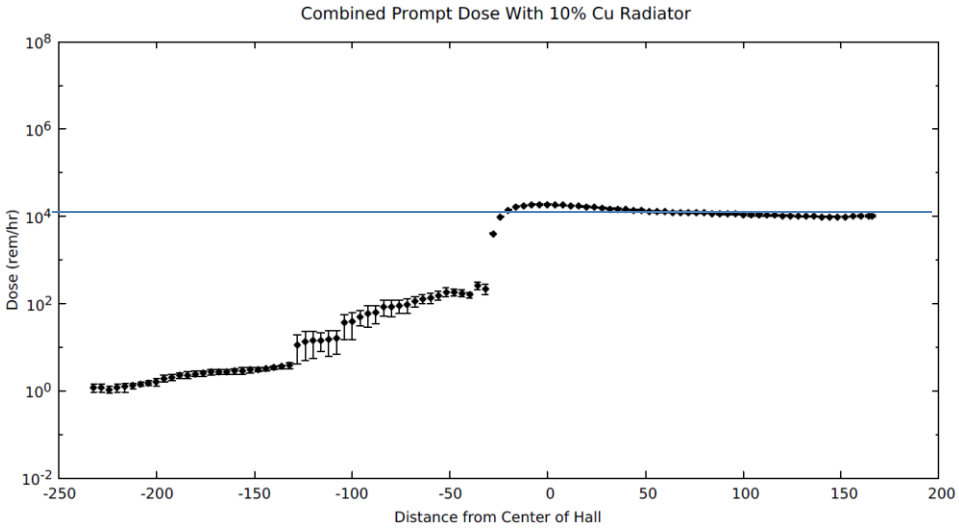


Prompt dose: 11 GeV, 2.7 μA, 10% Cu radiator

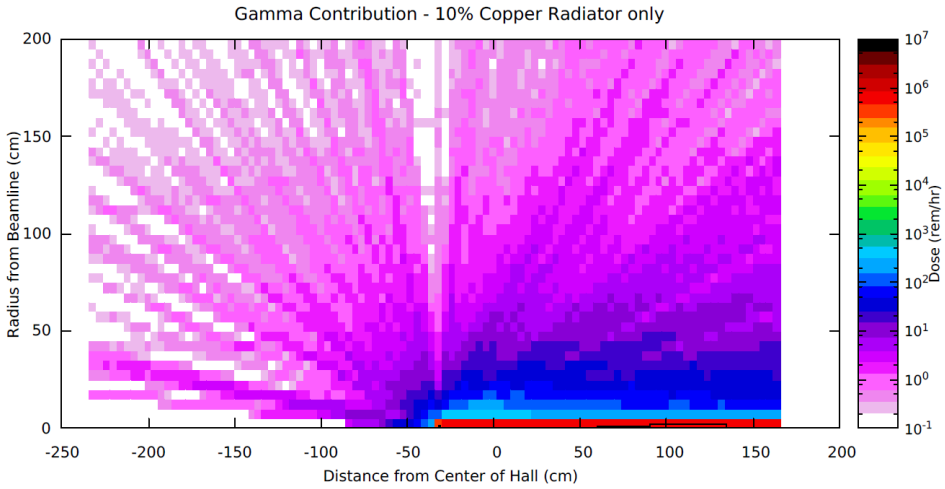


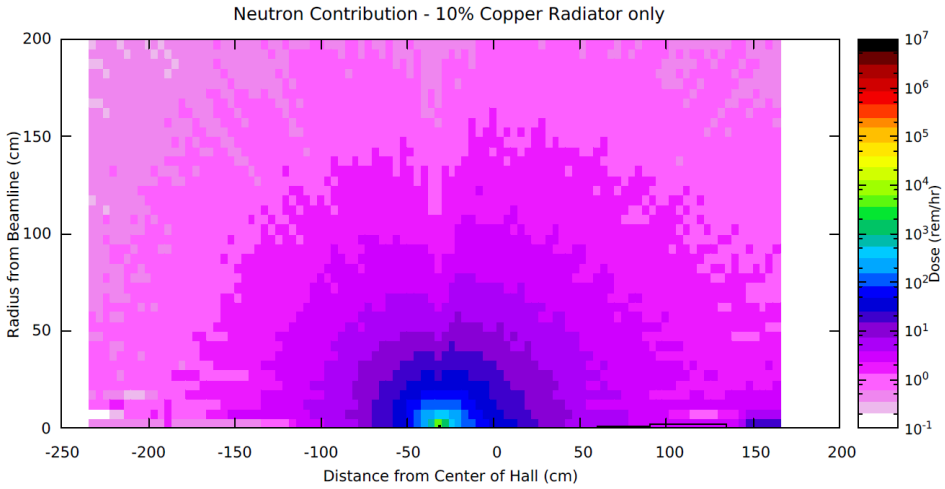


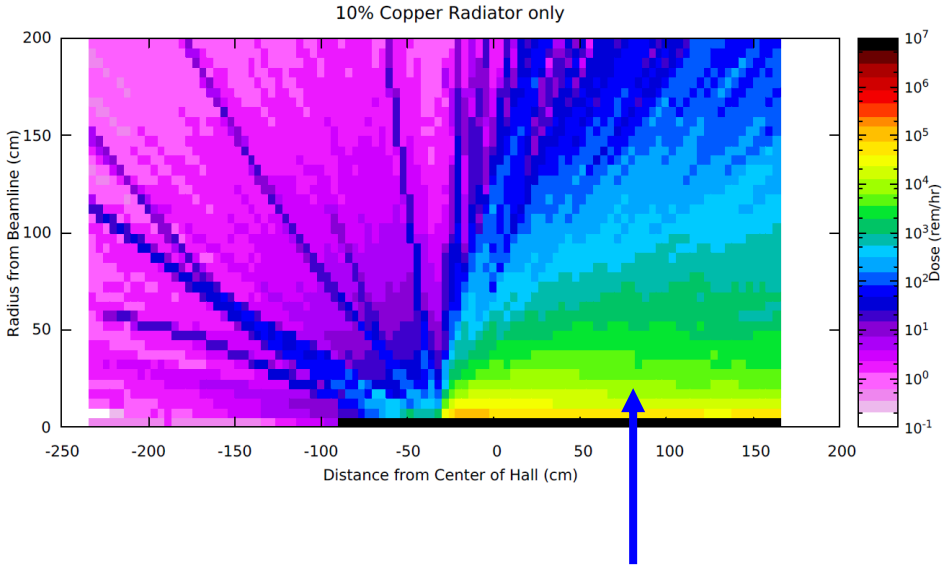
Gamma prompt dose +
Neutron prompt dose <<
Combined Prompt dose

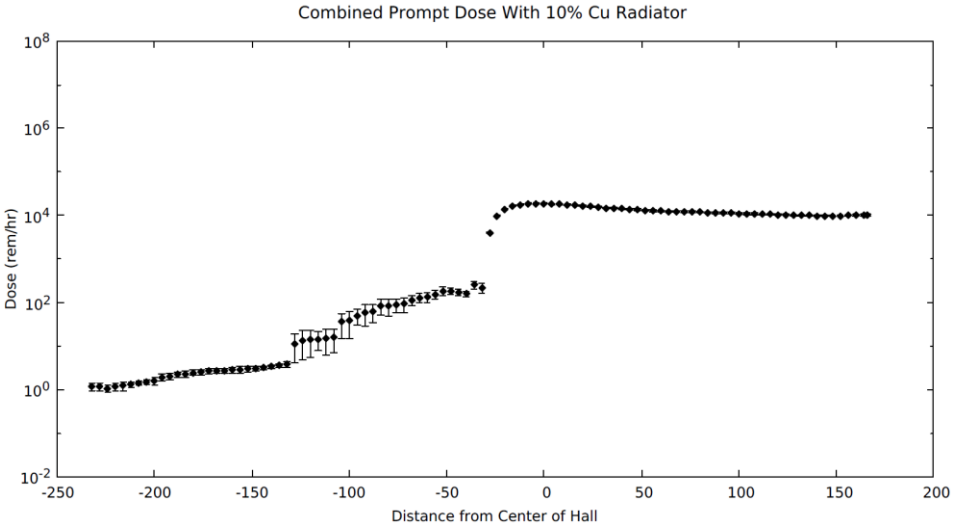


Prompt dose: 11 GeV, 2.7 μA, 10% Cu radiator



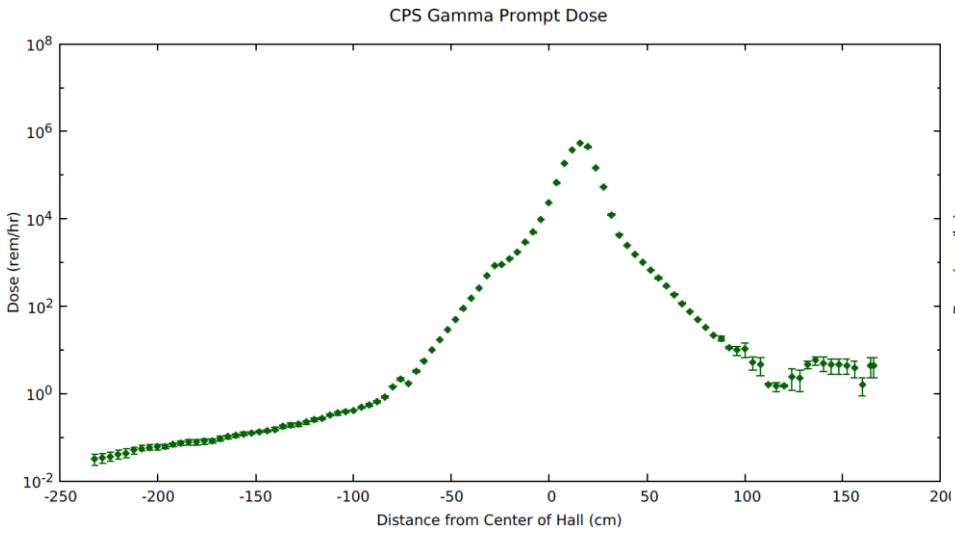


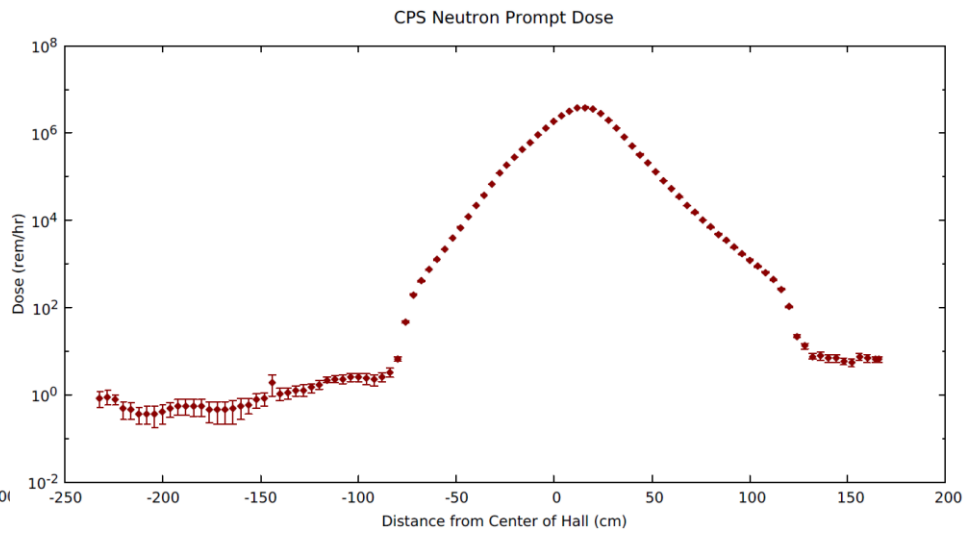




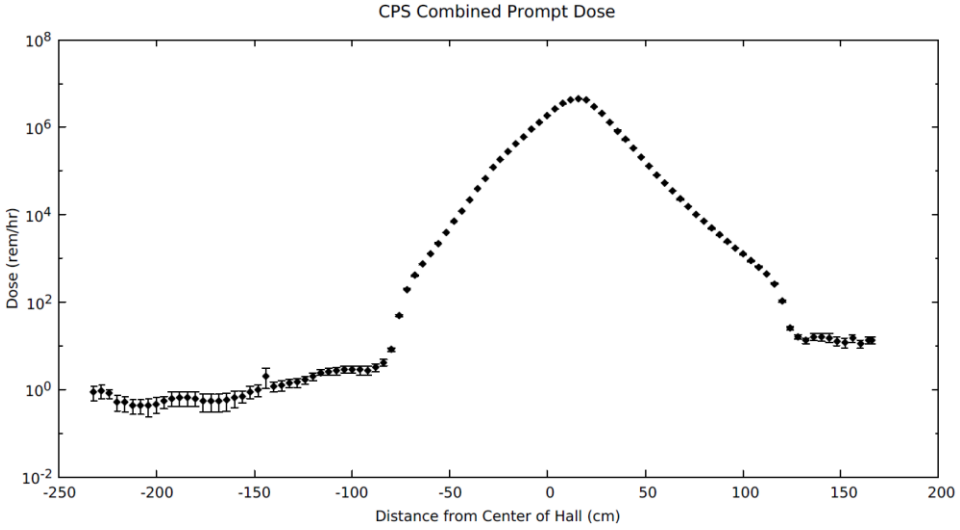
Contribution by $e^{+/-}$

Prompt dose: 11 GeV, 2.7 μA, 10% Cu radiator **with CPS**



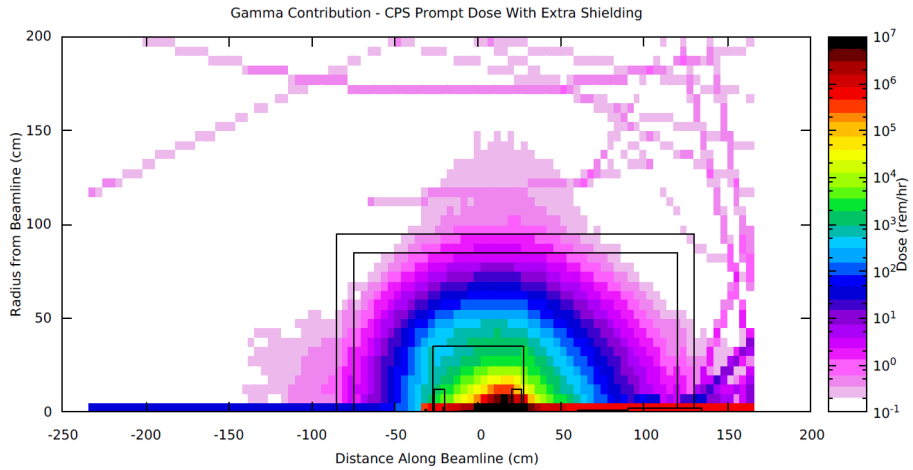


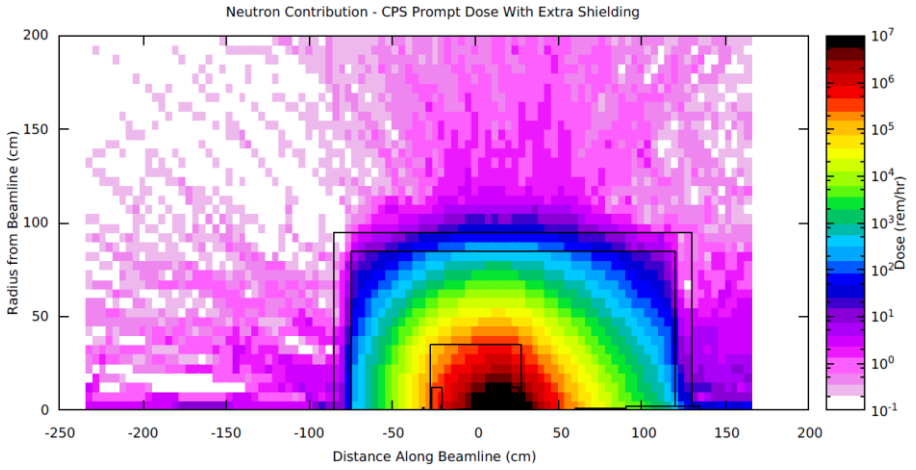
With CPS:
Neutron prompt dose ~
Combined Prompt dose
(i.e., gamma prompt dose
reduced and no $e^{+/-}$)

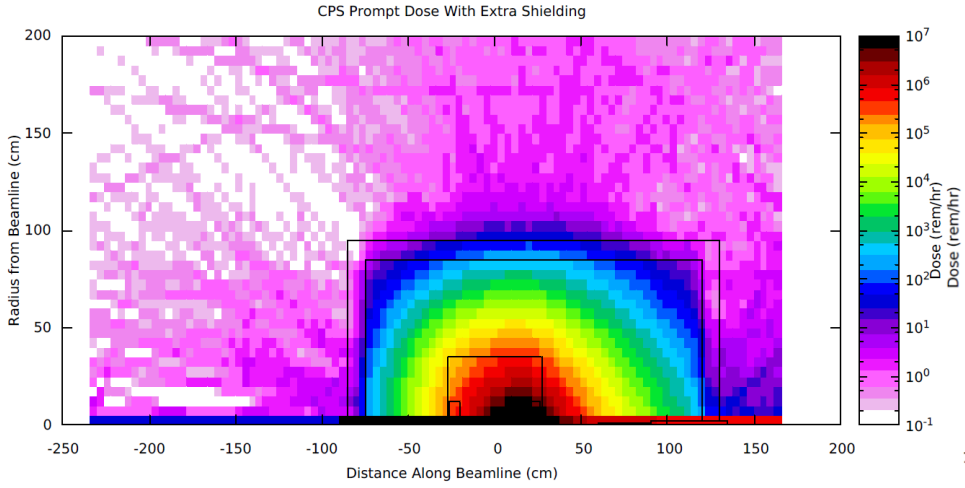


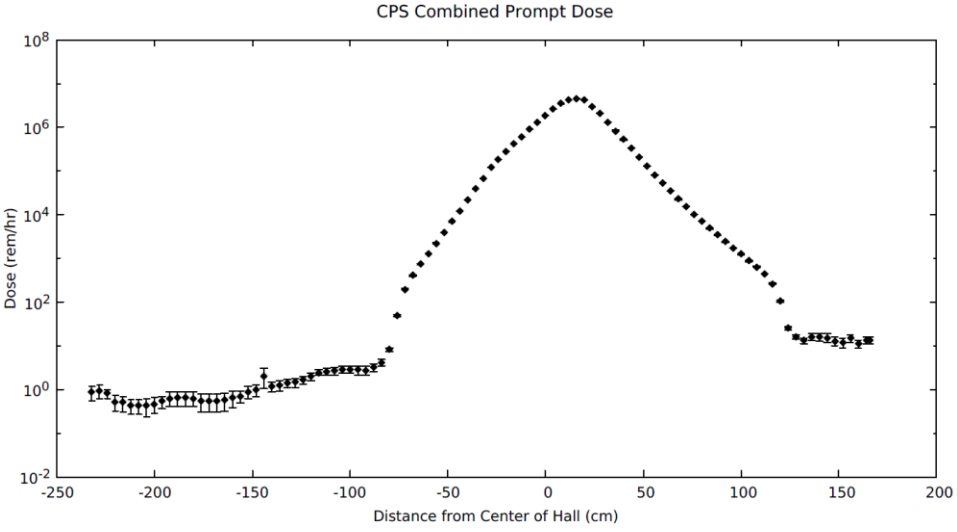
Prompt dose: 11 GeV, 2.7 μA, 10% Cu radiator **with CPS**

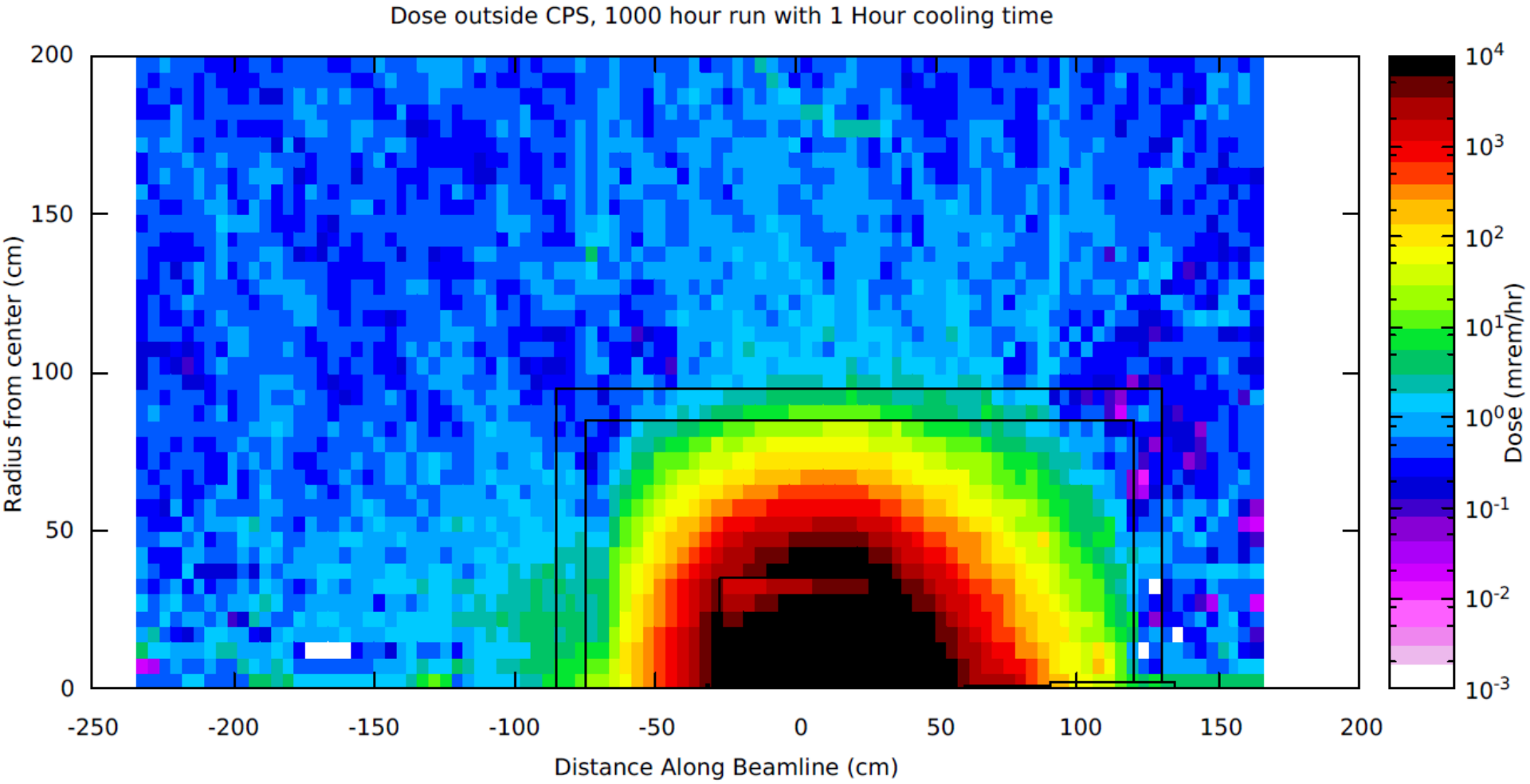
With CPS: Gamma prompt radiation confined

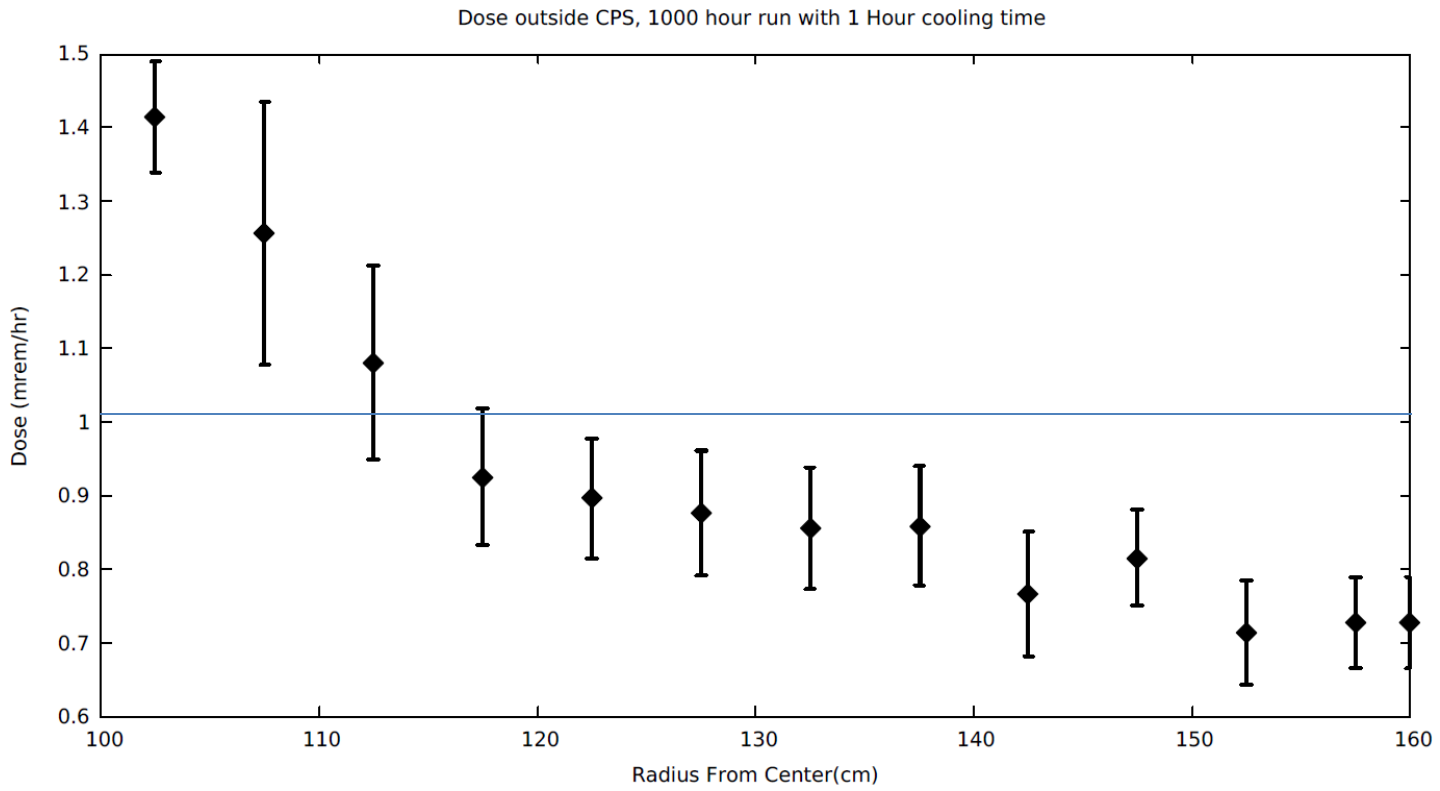






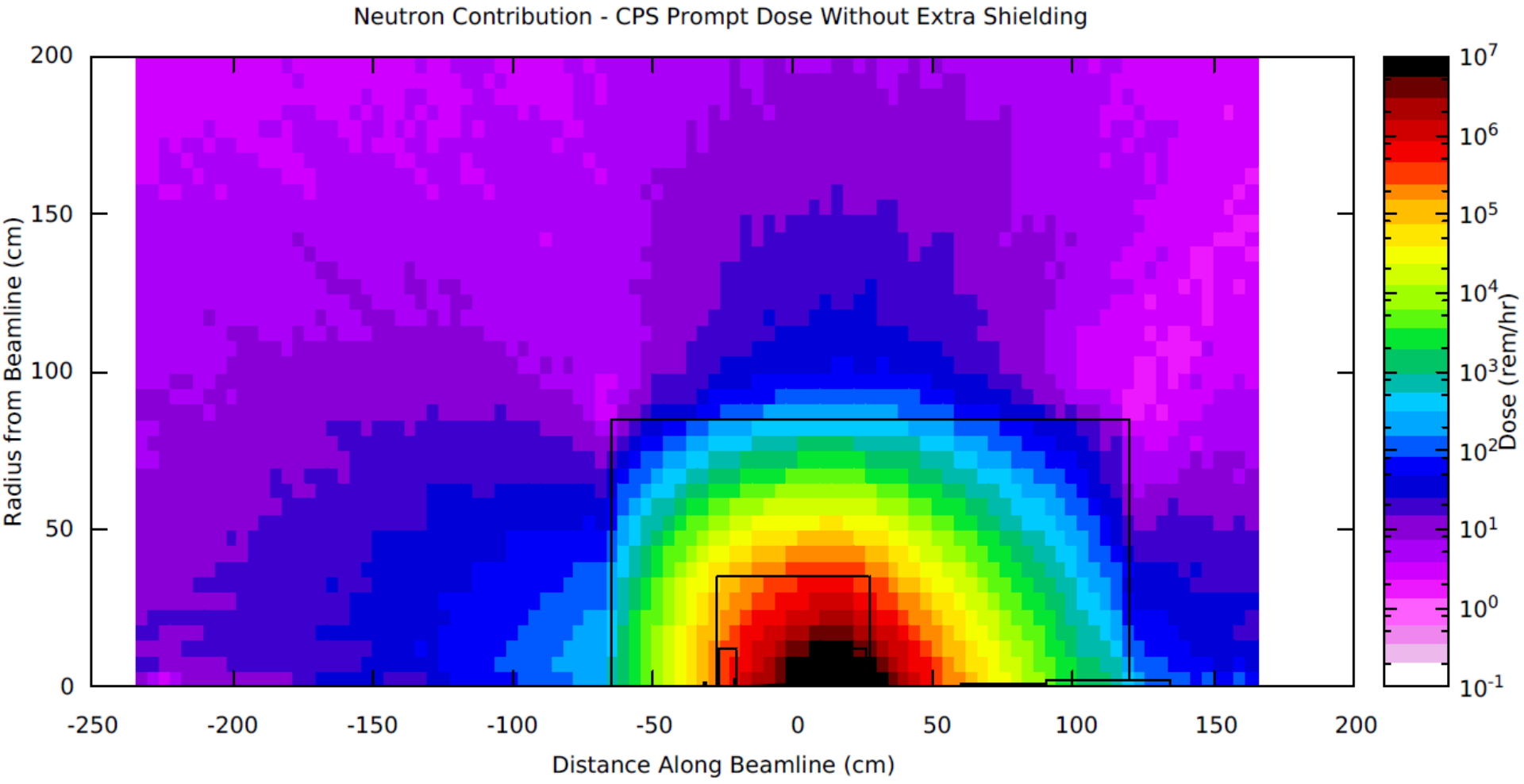



Dose outside CPS, 1000 hour run with 1 Hour cooling time
Radius from center (cm)
200
150
100
50
0
-250
-200
-150
-100
-50
0
50
100
150
200
Distance Along Beamline (cm)
Dose (mrem/hr)
10^{4}
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}

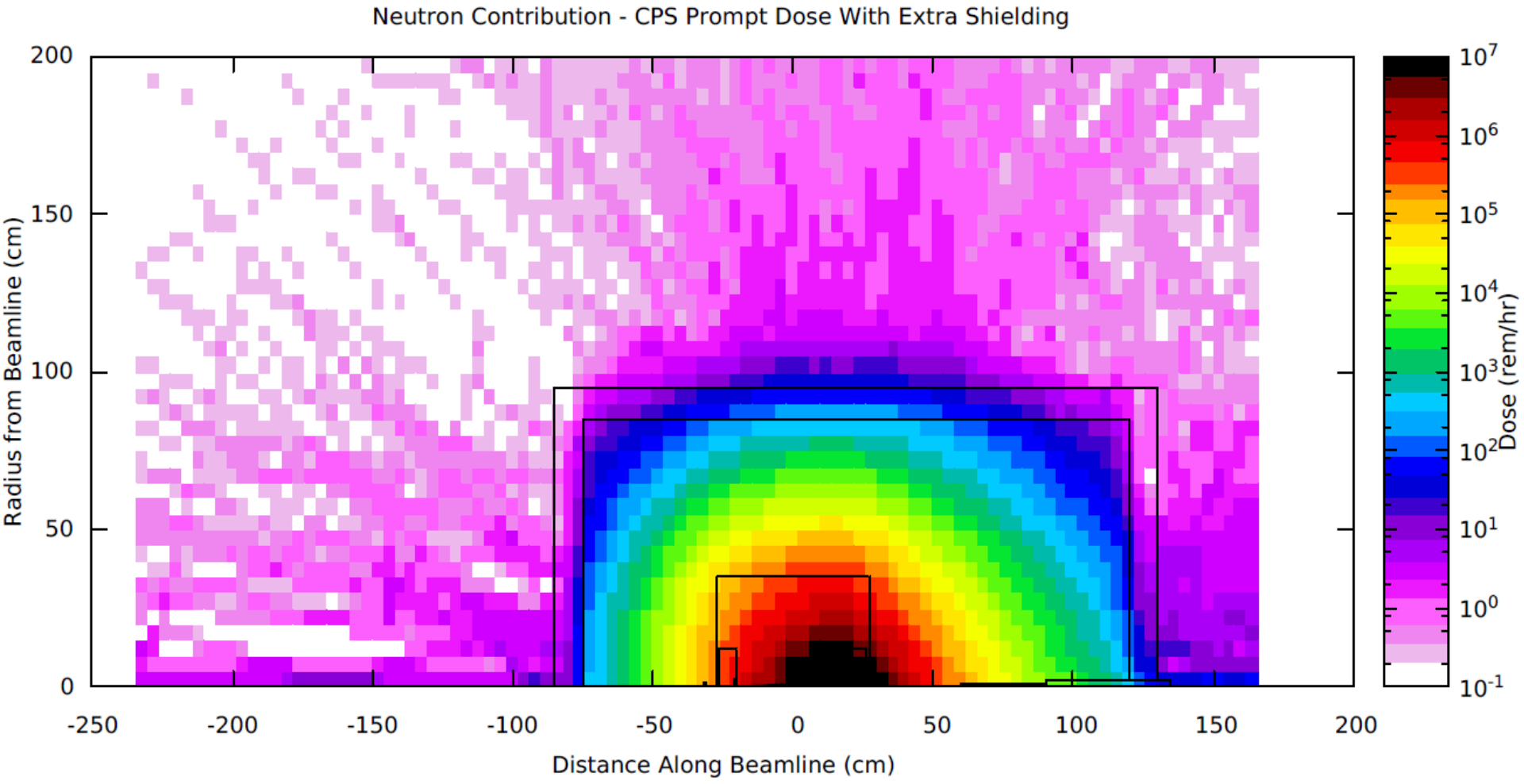


Dose outside CPS 1 hour after a 1000 hour run is < 1 mr/hr

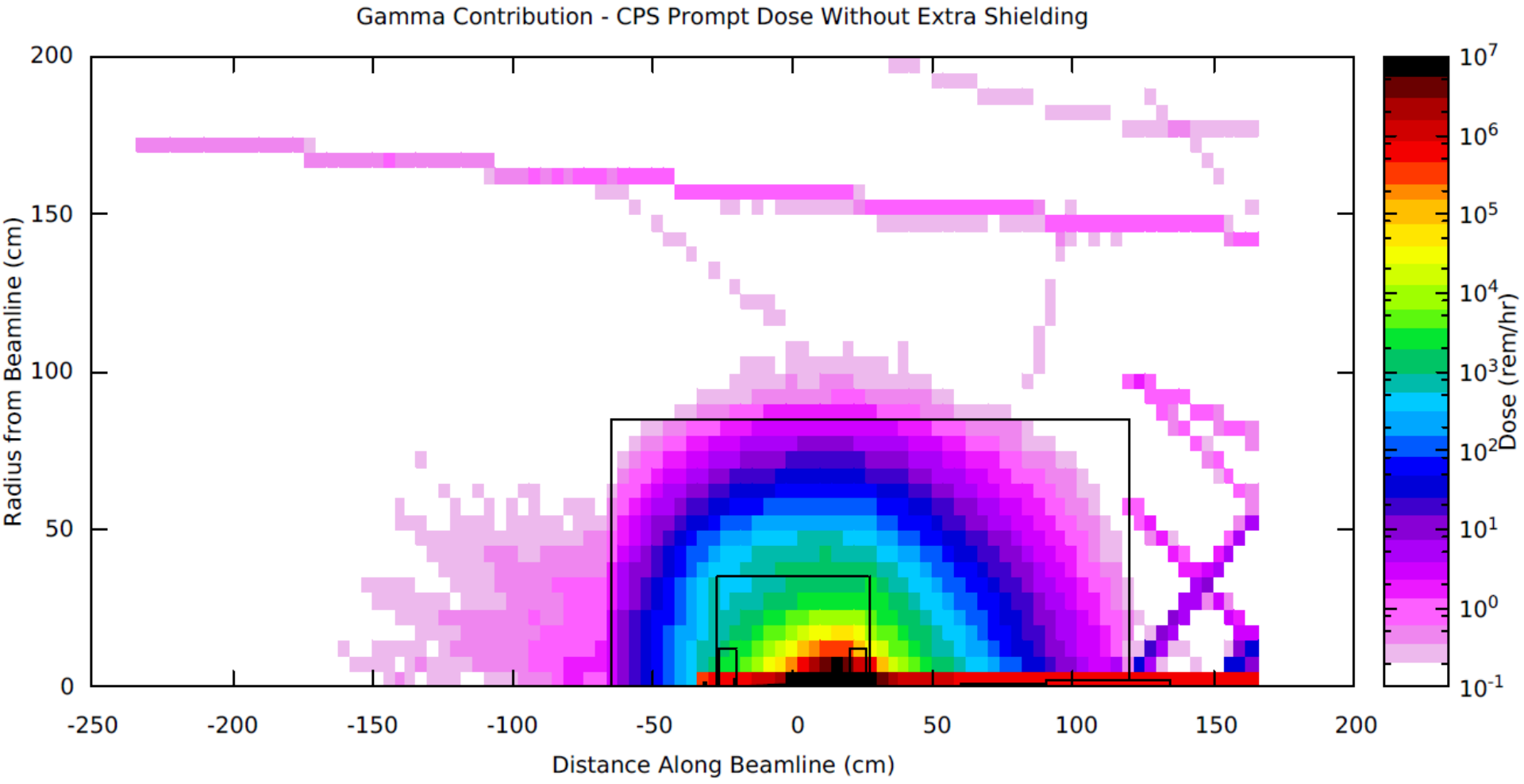
Neutron prompt dose with CPS without extra 10 cm W and 5% borated plastic



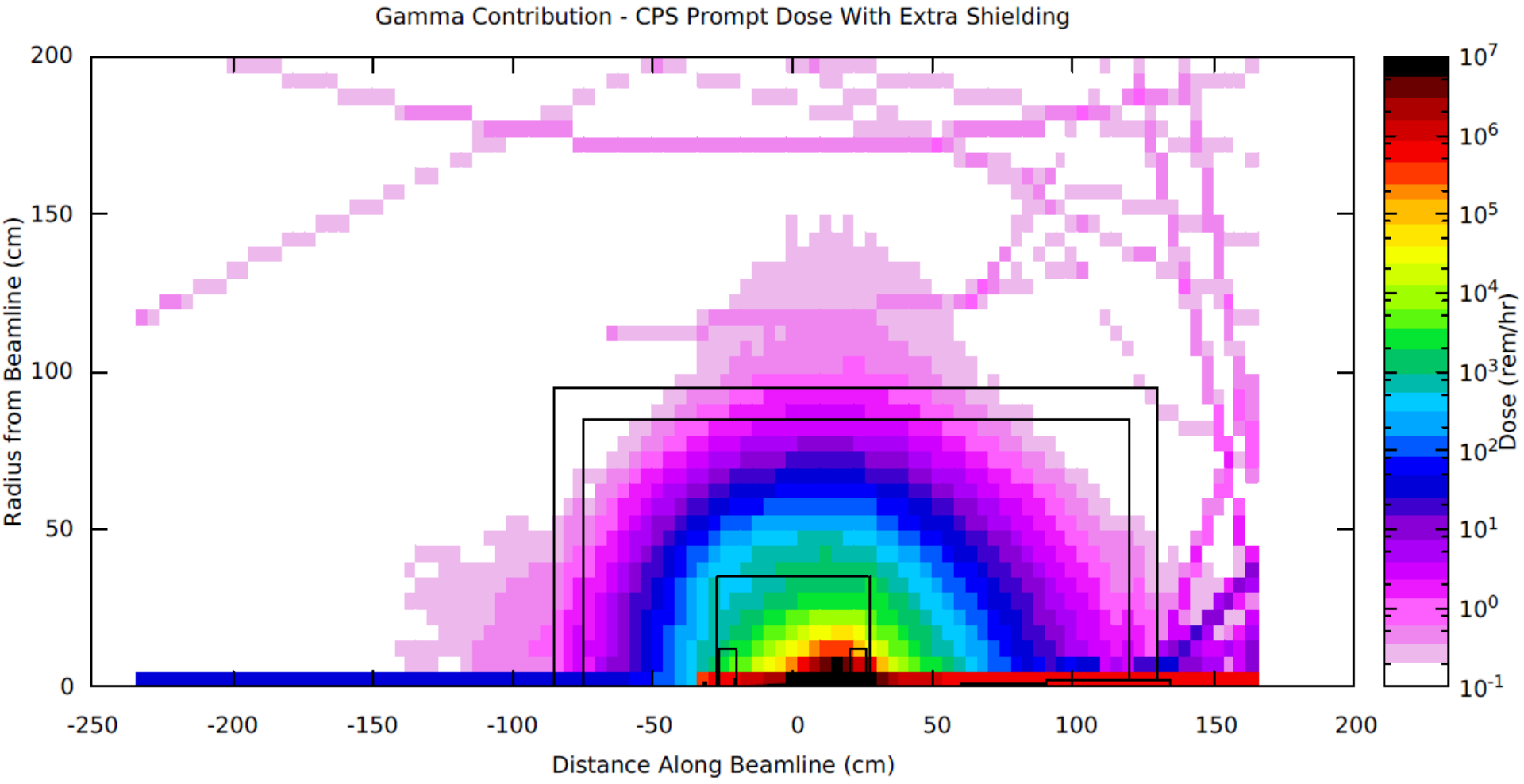
Neutron prompt dose with CPS **with** extra 10 cm W and 5% borated plastic



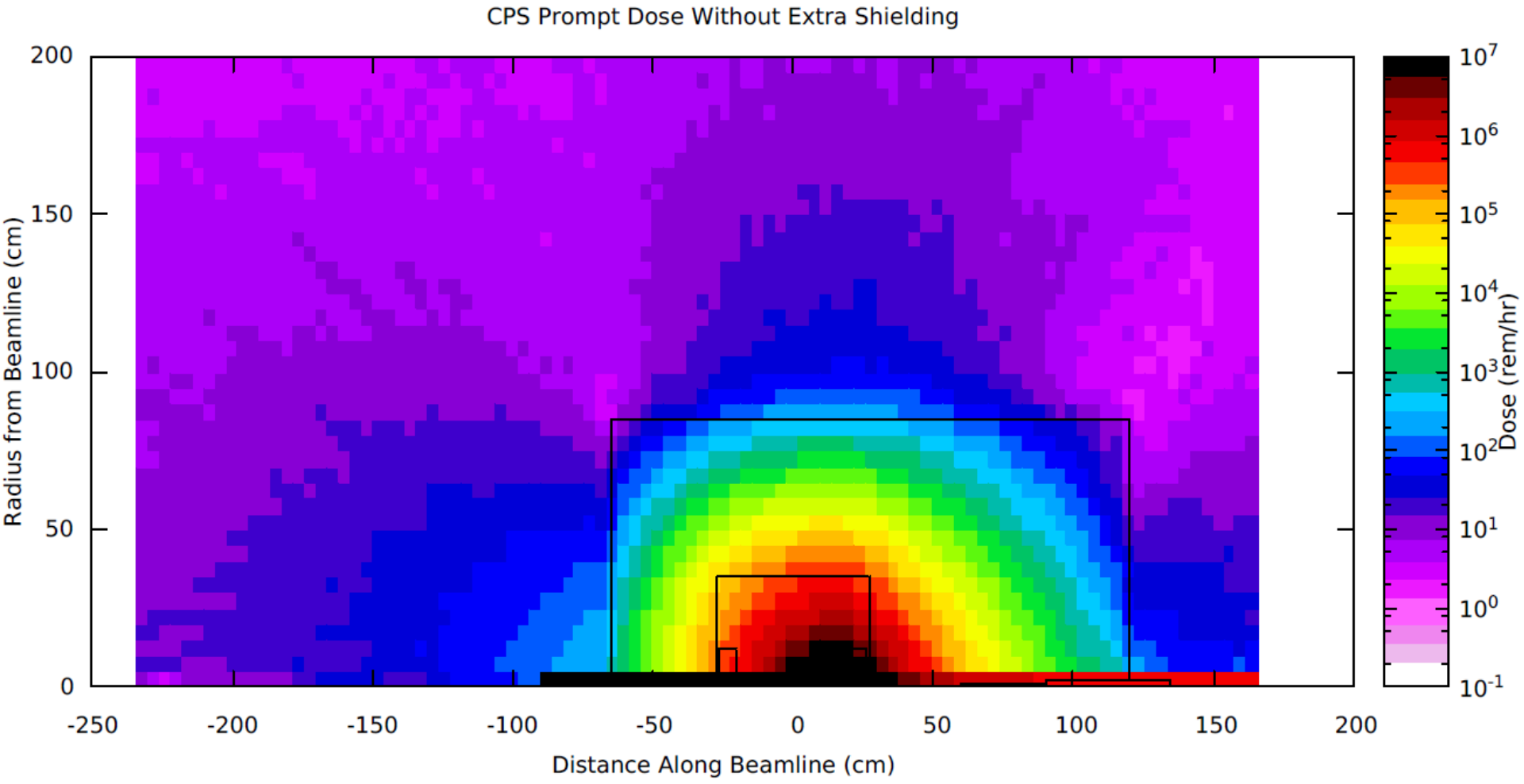
Gamma prompt dose with CPS without extra 10 cm W and 5% borated plastic



Gamma prompt dose with CPS **with** extra 10 cm W and 5% borated plastic



Combined prompt dose with CPS without extra 10 cm W and 5% borated plastic



Combined prompt dose with CPS **with** extra 10 cm W and 5% borated plastic