IDS120(?) WITH RESISTIVE MAGNETS: C TARGET
C TARGET STATION SET UP (+ CHICANE)

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IDS120(?) WITH RESISTIVE MAGNETS: WITH 20 cm GAPS BETWEEN CRYOSTATS

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SETTING UP GEOMETRY (+ CHICANE) ICEM = 1 MODE SIMULATIONS TBP.

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➡ SIMULATIONS CODE: mars15 (2014 [USING MCNPDATA x-SECTION LIBRARIES FOR NEUTRON INTERACTIONS WITH KE < 14 MeV]

➡ NEUTRON ENERGY CUTOFF: 10^{-12} GeV

➡ SHIELDING: 60% W + 40% He [WITH STST VESSELS]

➡ B_z (r = 0, z) : 20 T [z = 0.0 cm] ---→ 2.0 T [z ~ 530.0 cm]

➡ C ROD RADIUS / ANGLE: 0.58 cm / 59 mrads (~ 3.38 degrees) [-37.5 < z < 37.5 cm]

➡ PROTON BEAM POWER: 3.375 MW

➡ PROTON ENERGY: E = 6.75 GeV

➡ PROTON BEAM PROFILE : GAUSSIAN, $\sigma_x = \sigma_y = 0.145$ cm

➡ PROTON BEAM LAUNCH : (xo,yo,zo) = (-0.841, 3.560, -62.5) cm

➡ EVENTS IN SIMULATIONS : N_p = 5,000,000 [TBP]

CHICANE SET UP

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- START : Zo = 2600.0 END : Zf = 3530.0 (?)
- # COILS / LENGTH / DRIFT DIST. / ROTAT. / R: 40 / 18.0 cm / 7.0 cm / 0.625 deg. (C 2C) / 50.0 cm
- SHIELDING : 60% W + 40% He [WITH 1.0 cm THICK STST VESSEL(?)]
- SHIELDING RADIAL THIKNESS CYLIDRICAL REGION : SH_th= 14.0 cm
- STST BEAM PIPE : R = 23.0 cm/[2865.0 < z < 3265.0 cm(?)] : AxB = 31.0 x 23.0 cm
- BEAM PIPE – SC COILS GAP : 5.0 cm (?)

IDS120(?): yz CROSS SECTION (x = 0.0 cm) WITH CHICANE.

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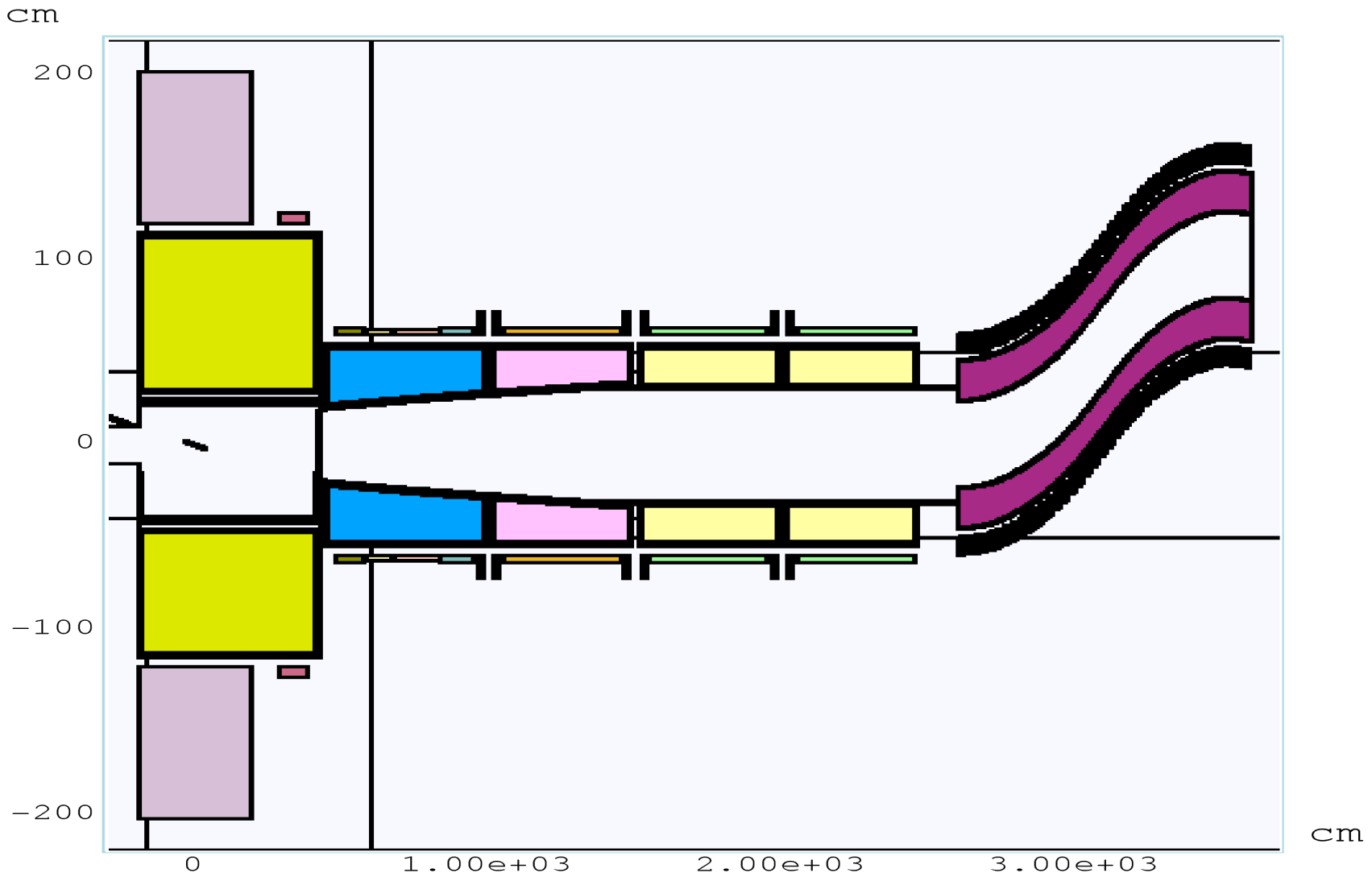
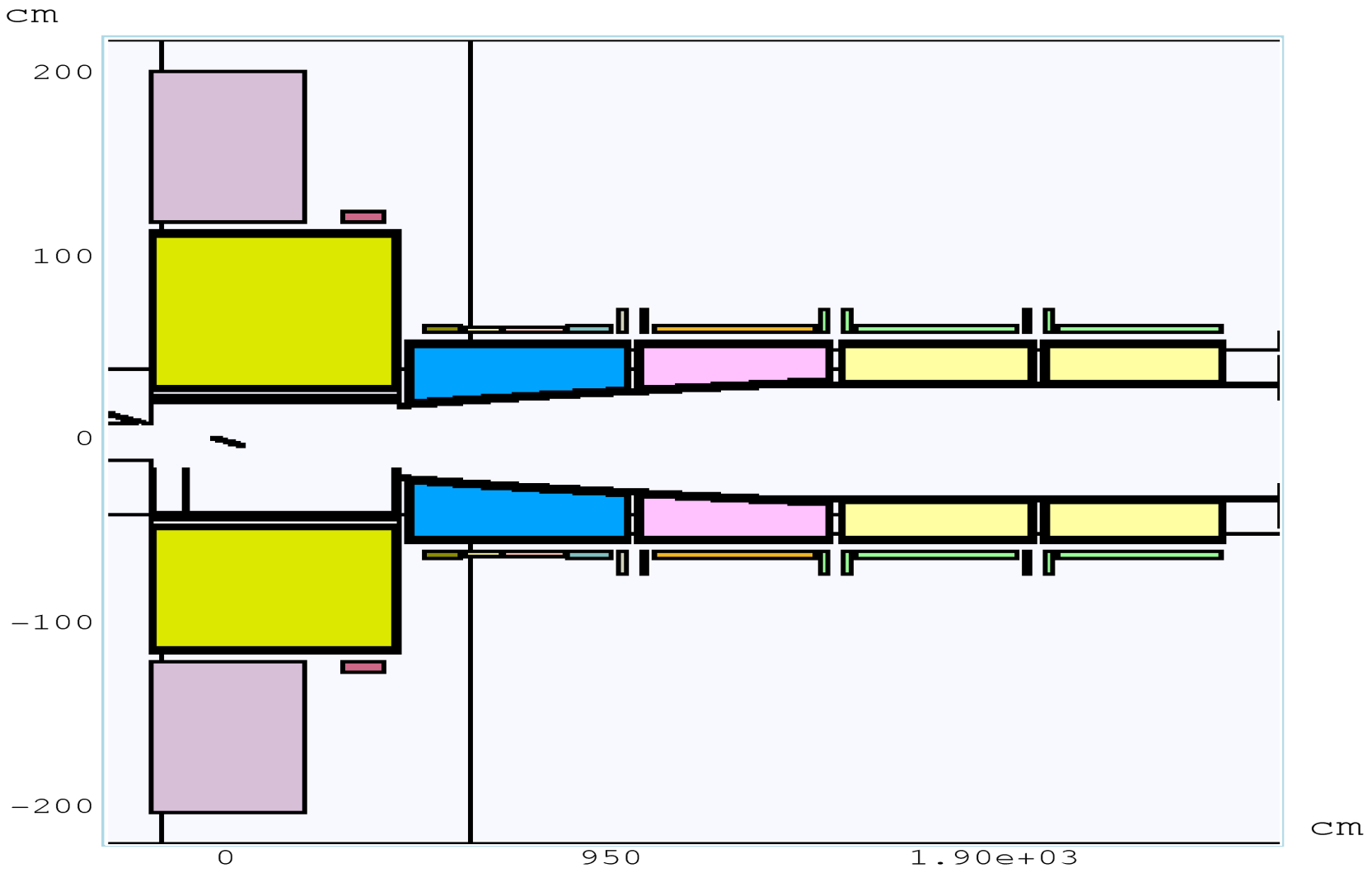
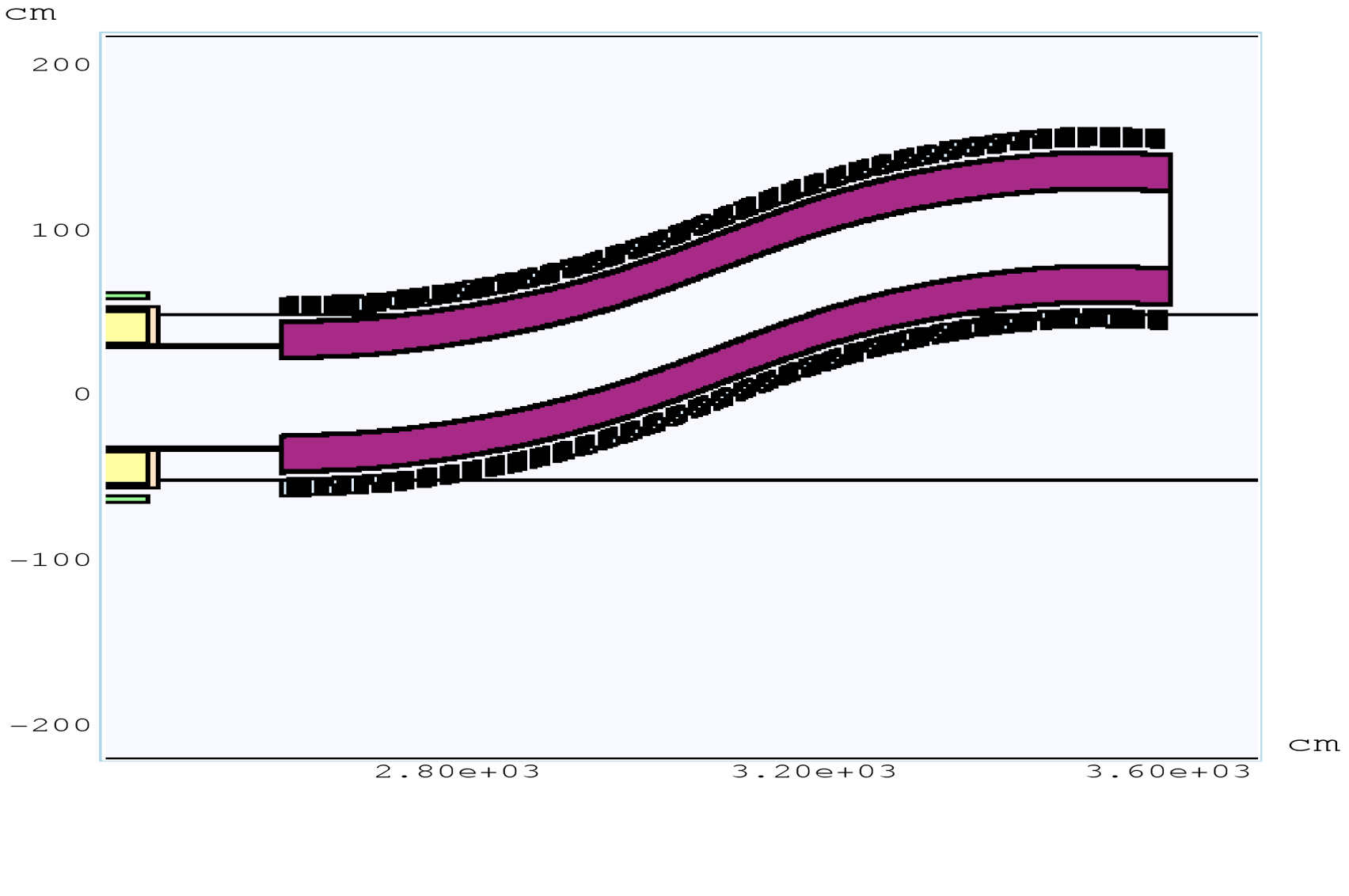


IDS120(?): yz CROSS SECTION (x = 0.0 cm).

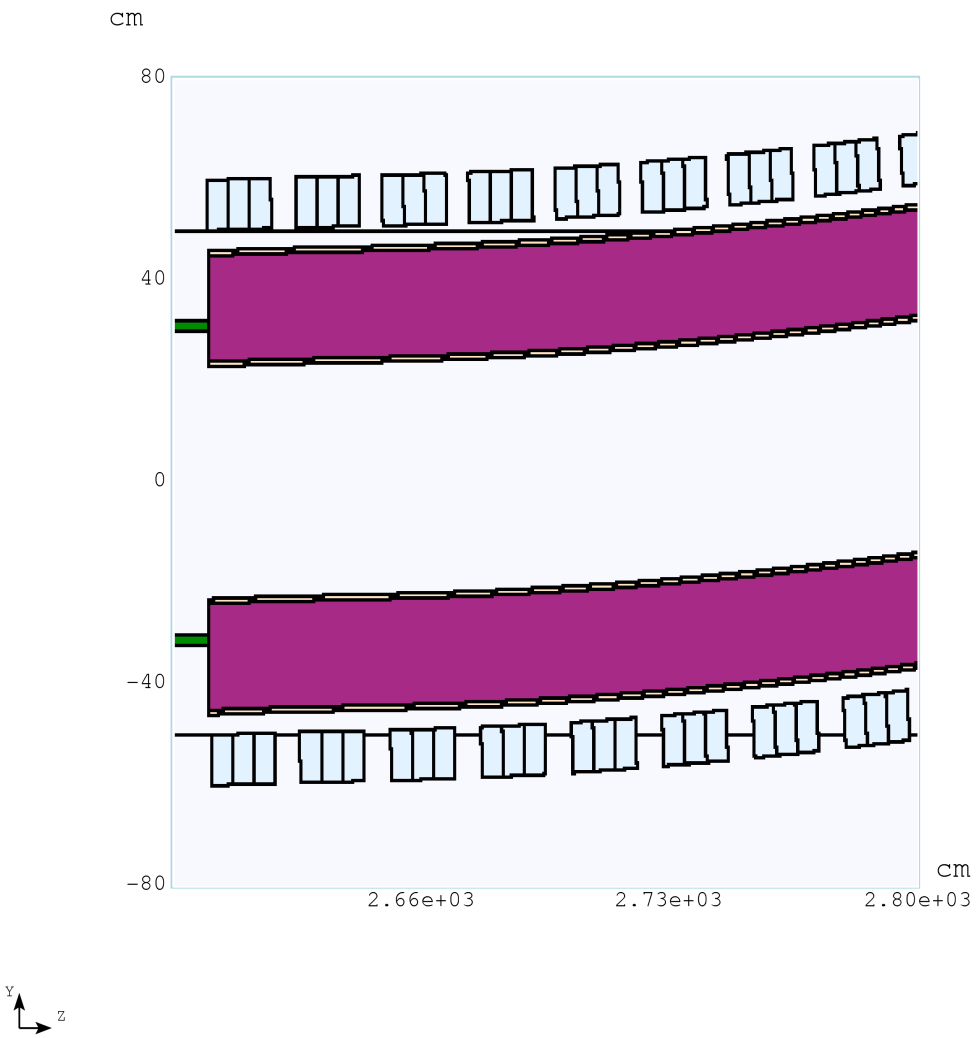


CHICANE : yz CROSS SECTION (x = 0.0 cm).



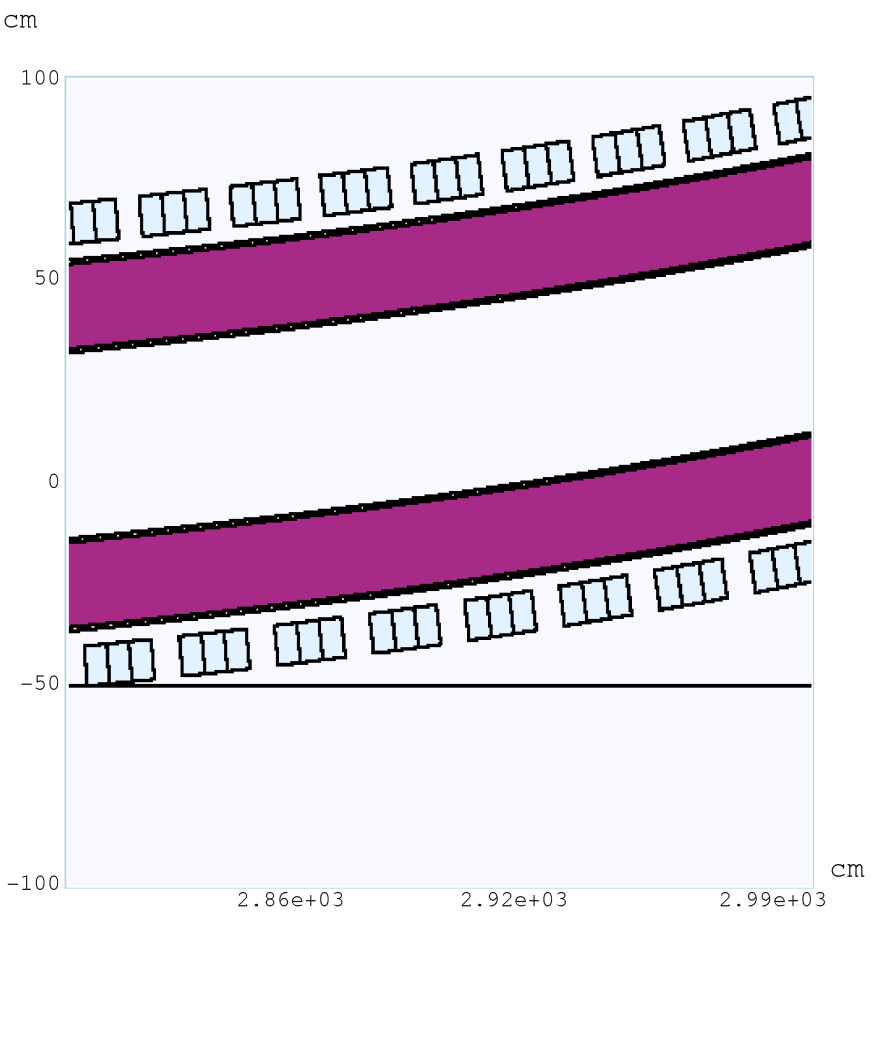
CHICANE : yz CROSS SECTION (x = 0.0 cm)

Z REGION: [2590.0, 2800.0] cm



Aspect Ratio: Y:Z = 1:1.3125

[2800.0, 3000.0] cm

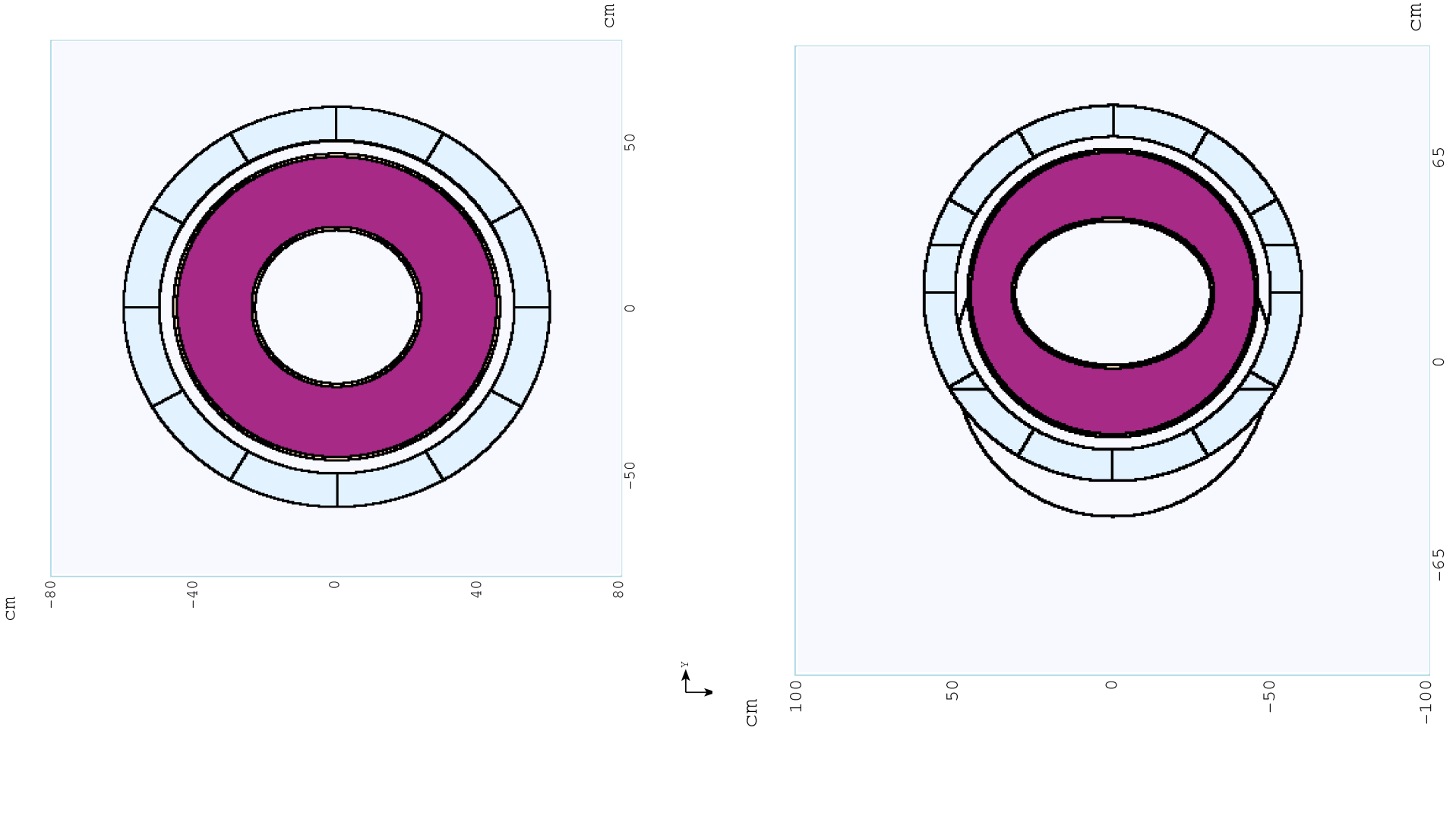


Aspect Ratio: Y:Z = 1:1.0

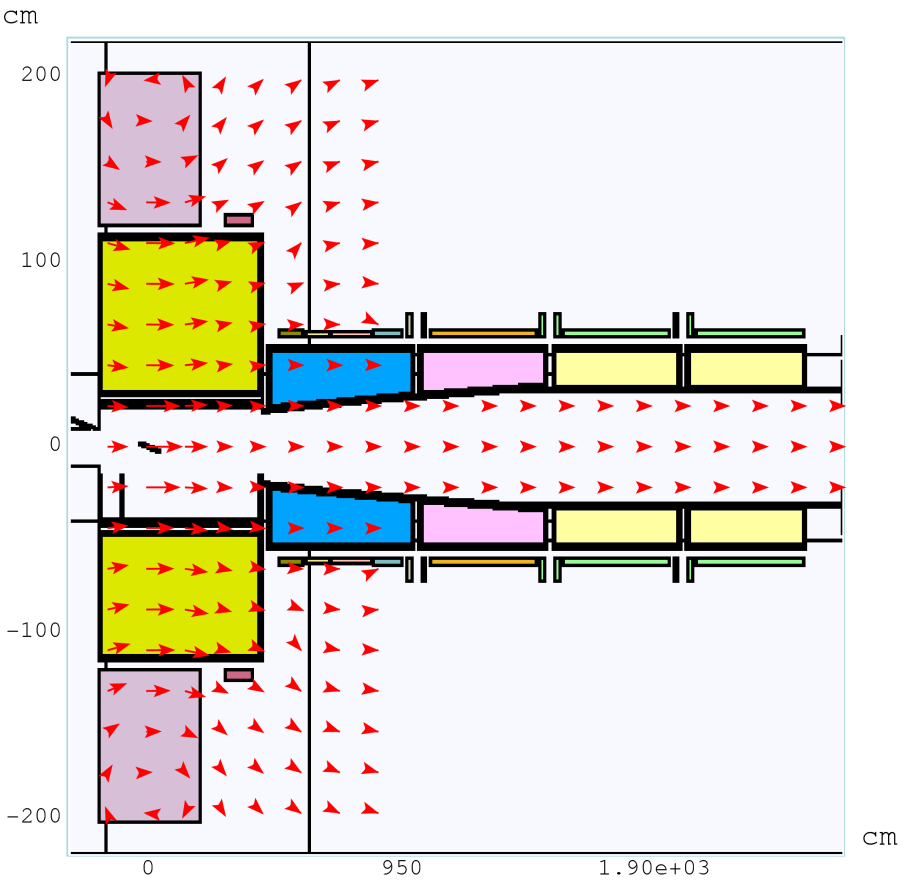
CHICANE : xy CROSS SECTION WITH SEGMENTED COILS

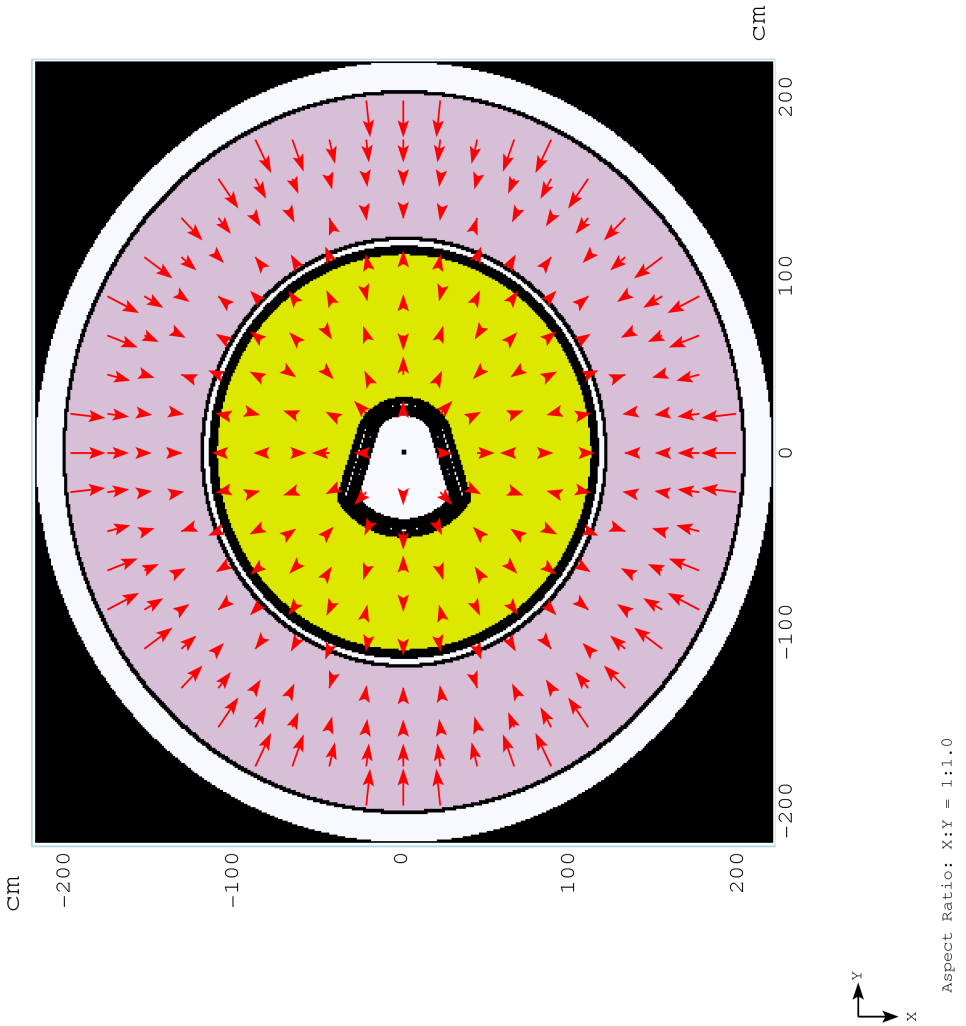
Z = 2610.0 cm [BP CYLINDER R = 23.0 cm] ==> LEFT

Z = 2910.0 cm [BP ELLIPSIS A x B = 31.0 x 23.0 cm FOR 2865.0 < Z < 3265.0 cm ?] ==> RIGHT



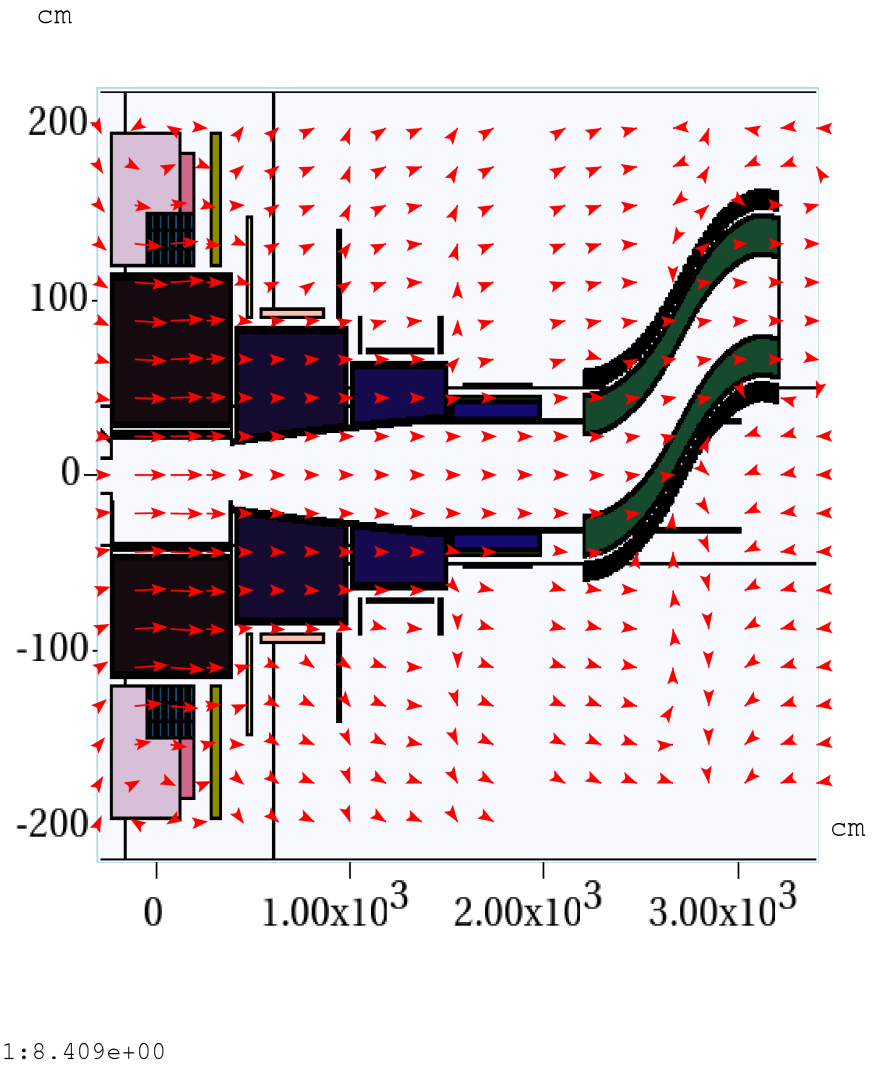
IDS120(?) : yz AT x = 0.0 [LEFT] AND xy AT z = 0.0 cm [RIGHT] CROSS SECTION WITH MAGNETIC FIELD MAP (5 x 5 cm GRID)

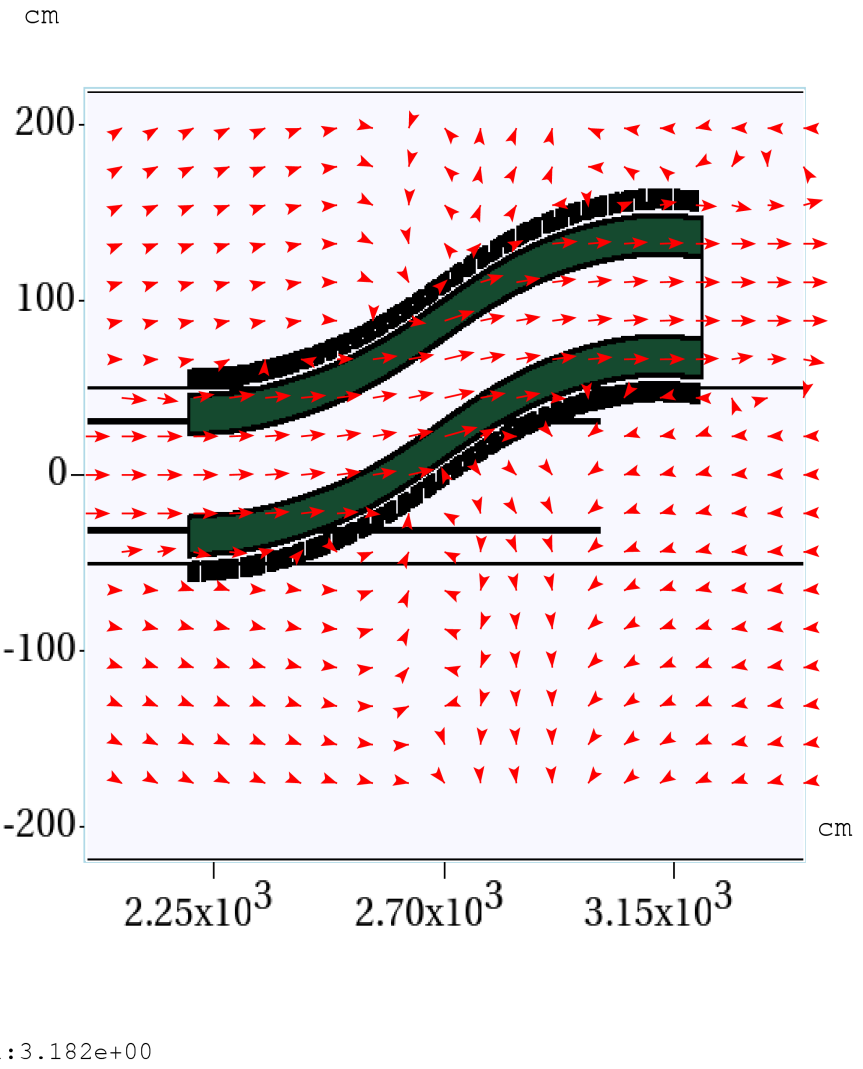




IDS120j FIELD MAP: **yz CROSS SECTION (AT x = 0.0) BOTH MAPS [LEFT] AND CHICANE REGION ONLY [RIGHT] == PRINCETON CLUSTER**

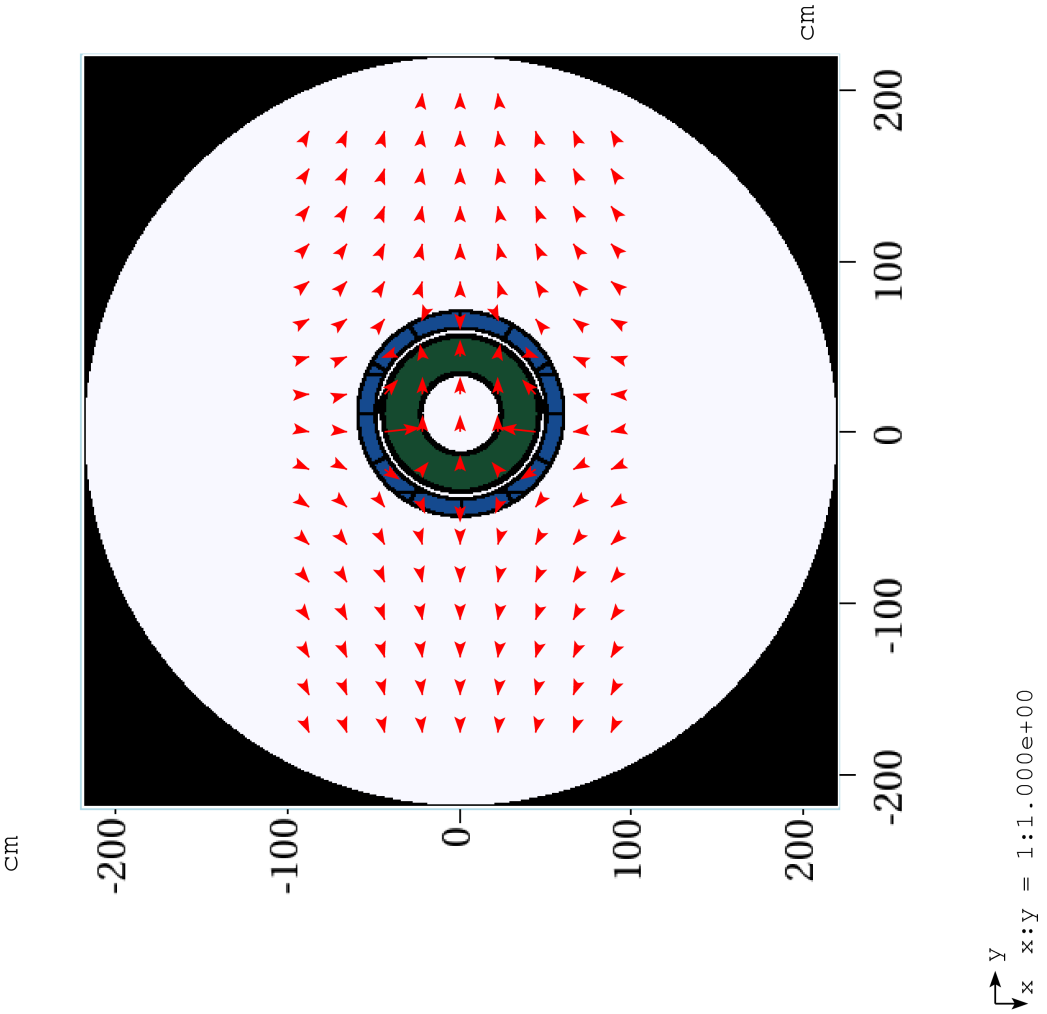
(MAPS GRID : dr x dz 5 x 5 cm IDS120j / dx x dy x dz = 5 x 5 x 5 cm CHICANE)

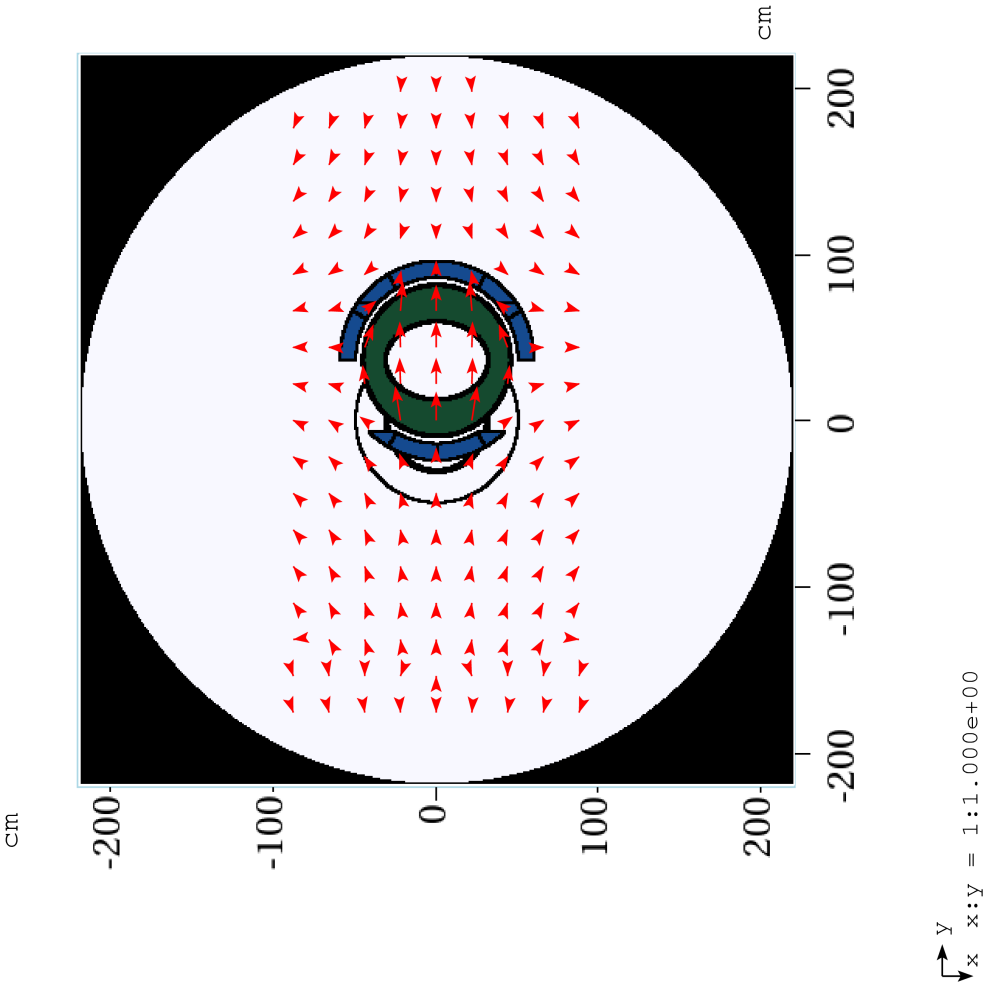




IDS120j FIELD MAP: xy CROSS SECTION AT Z = 2410.0 cm [LEFT] AND AT Z = 2600.0 cm [RIGHT] == PRINCETON CLUSTER

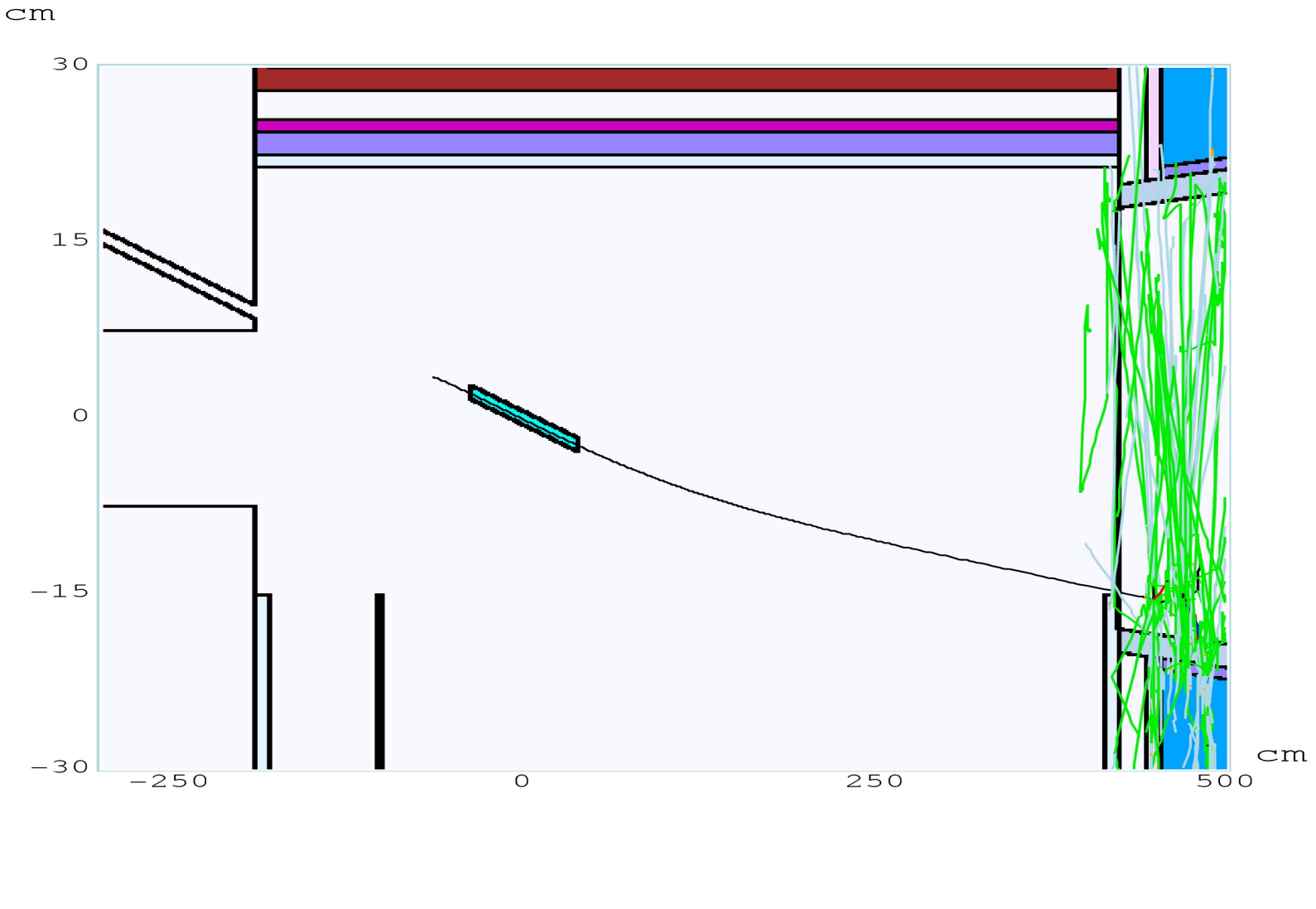
(MAPS GRID : dr x dz 5 x 5 cm IDS12j / dx x dy x dz = 5 x 5 x 5 cm CHICANE)



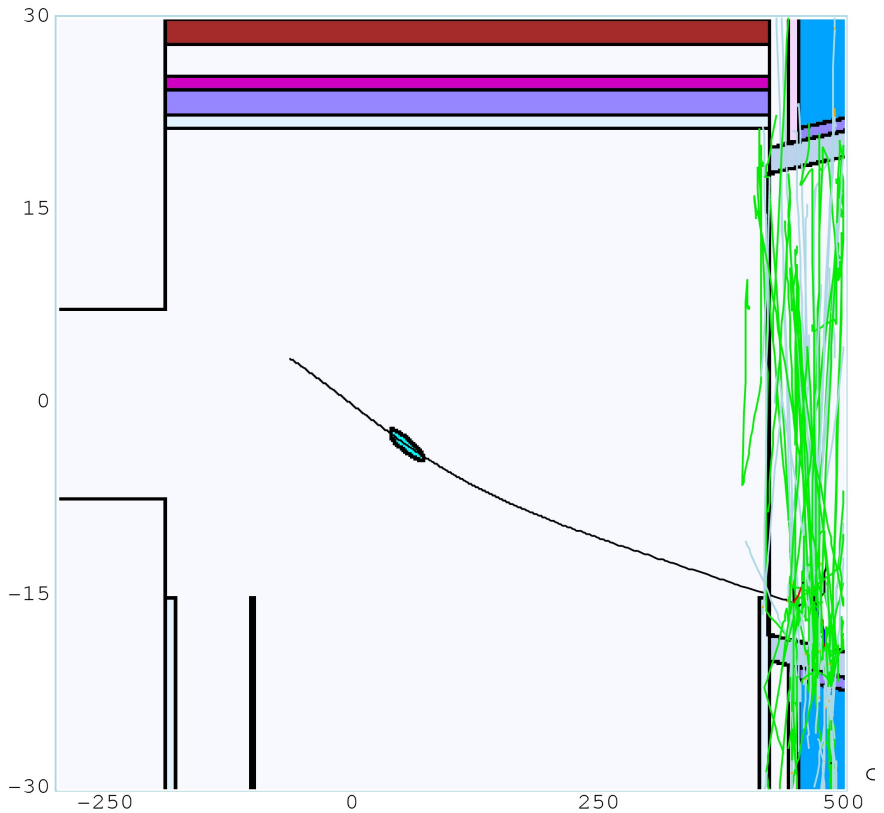


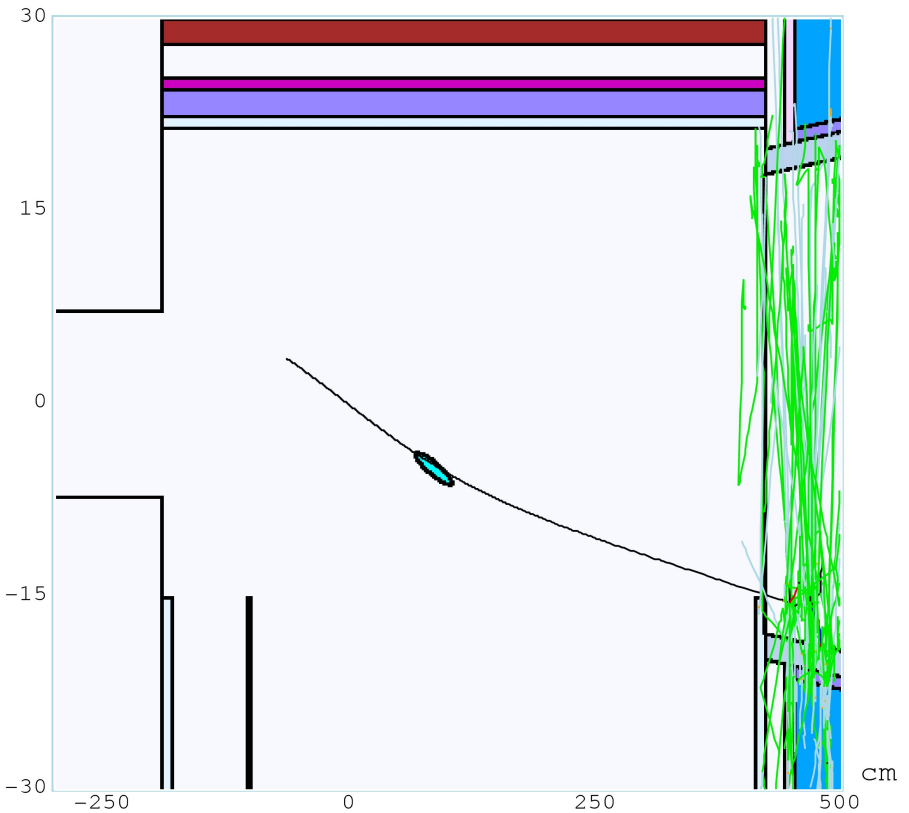
IDS120(?): **yz CROSS SECTION (AT x = 0.0 cm) WITH 6.75 GeV PROTON BEAM CENTROID TRAJECTORY WITH AIR IN PLACE OF C TARGET AND DUMP (AREA OF TARGET CAN BE SEEN).**

Be WINDOW IS NOW MORE EXPOSED TO SCATTERED BEAM PROTONS + NEUTRONS

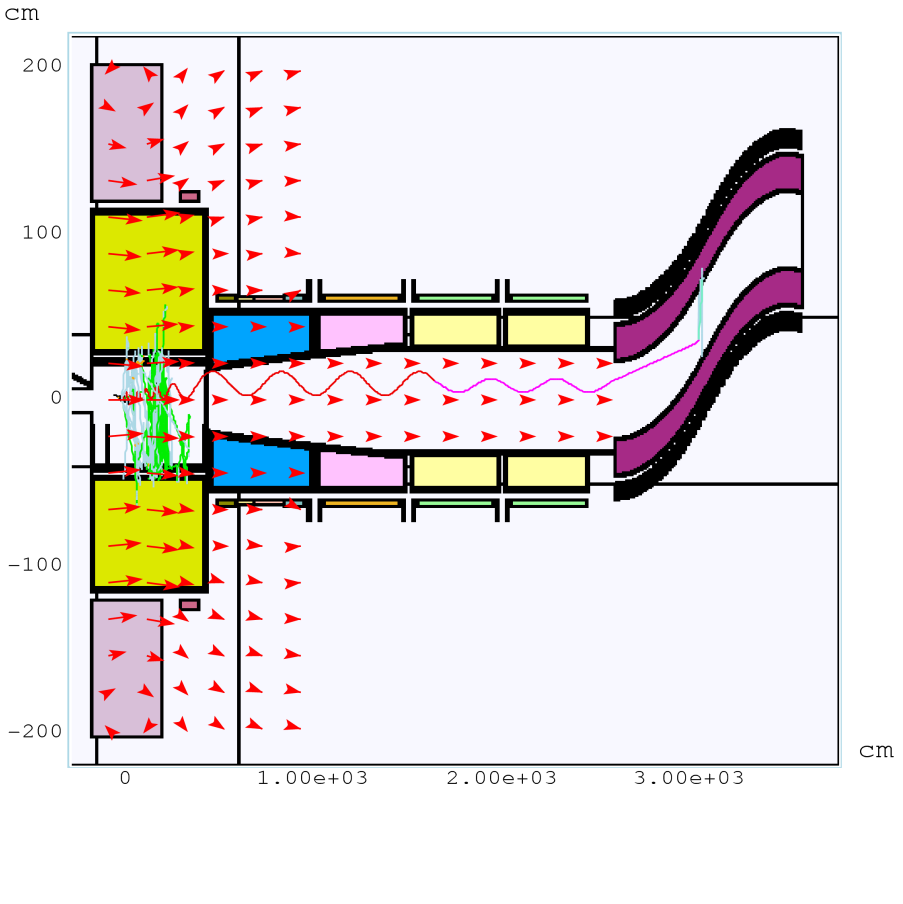


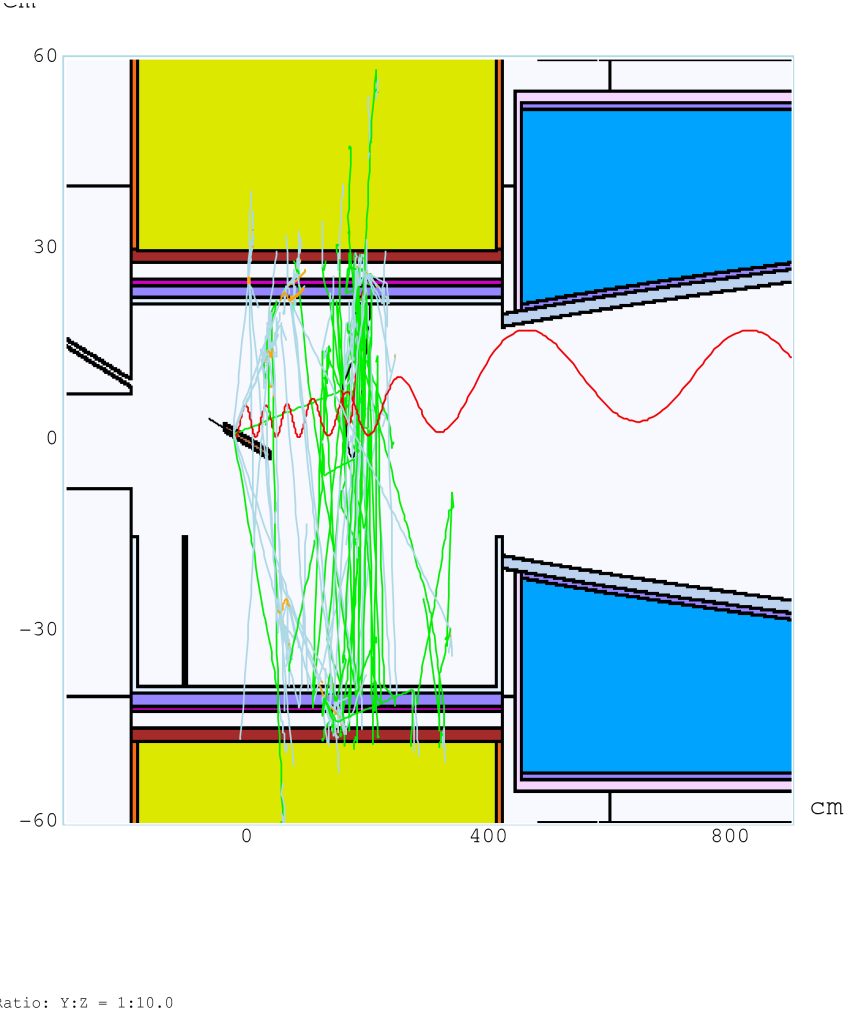
IDS120(?): **yz CROSS SECTION AT x = -1.0 cm [LEFT] AND AT x = -2.0 cm [RIGHT] WITH 6.75 GeV PROTON BEAM CENTROID TRAJECTORY WITH AIR IN PLACE OF C TARGET AND DUMP**
(AREA OF ROTATED DUMP CAN BE SEEN)



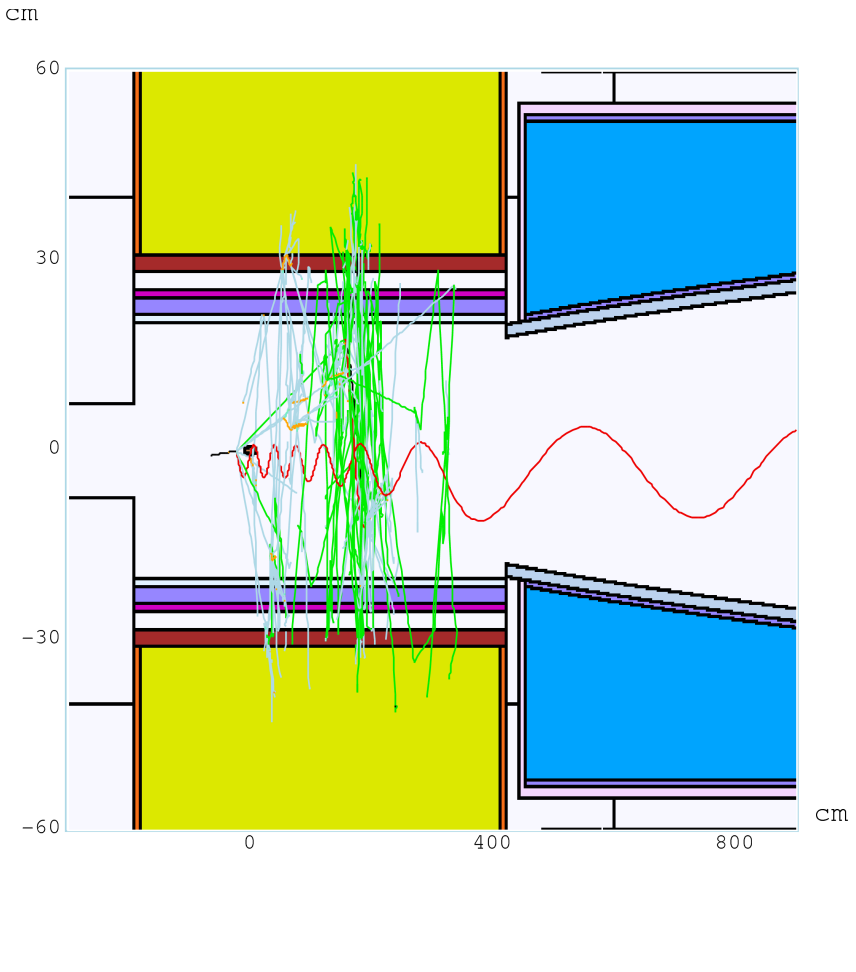


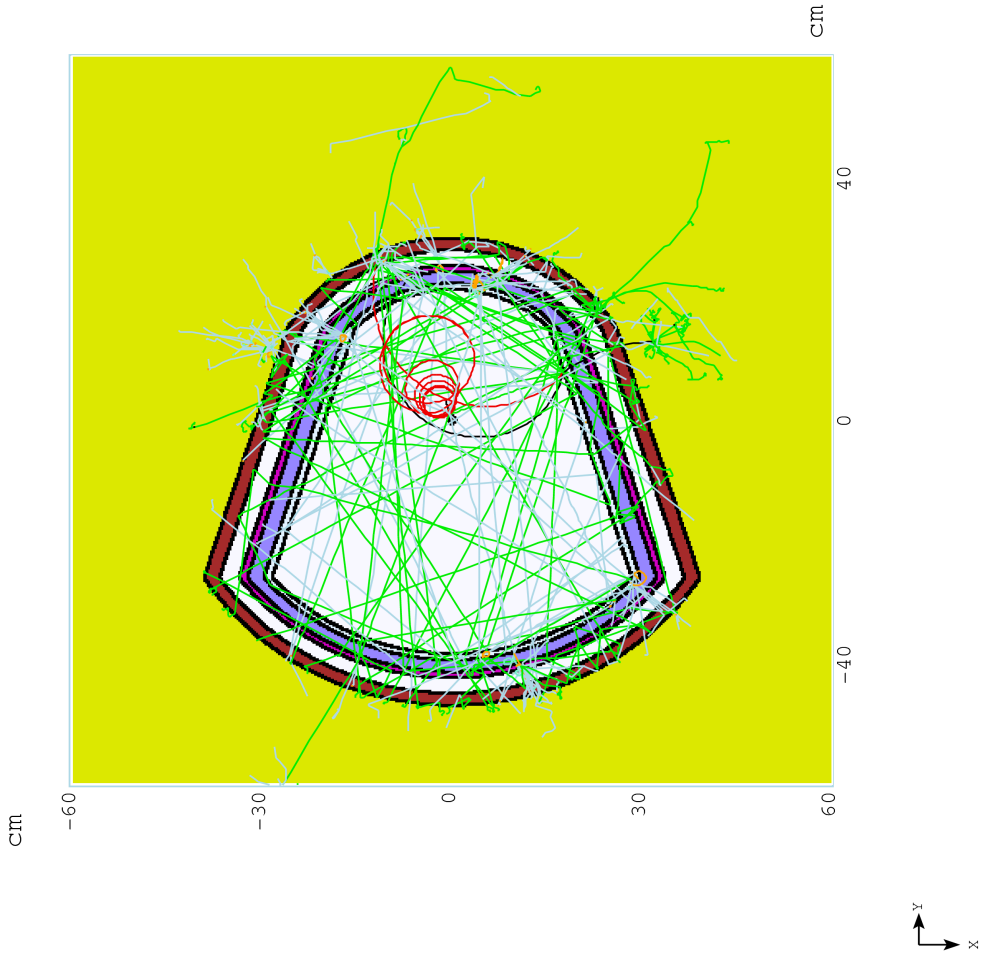
IDS120(?): yz CROSS SECTION AT x = 0.0 cm GLOBAL [LEFT] AND LOCAL [RIGHT] WITH 6.75 GeV PROTON BEAM CENTROID TRAJECTORY INTERACTING WITH C TARGET / DUMP RED LINE IS A PION+ THAT DECAY TO MUON+ AT Z ~ 16 m



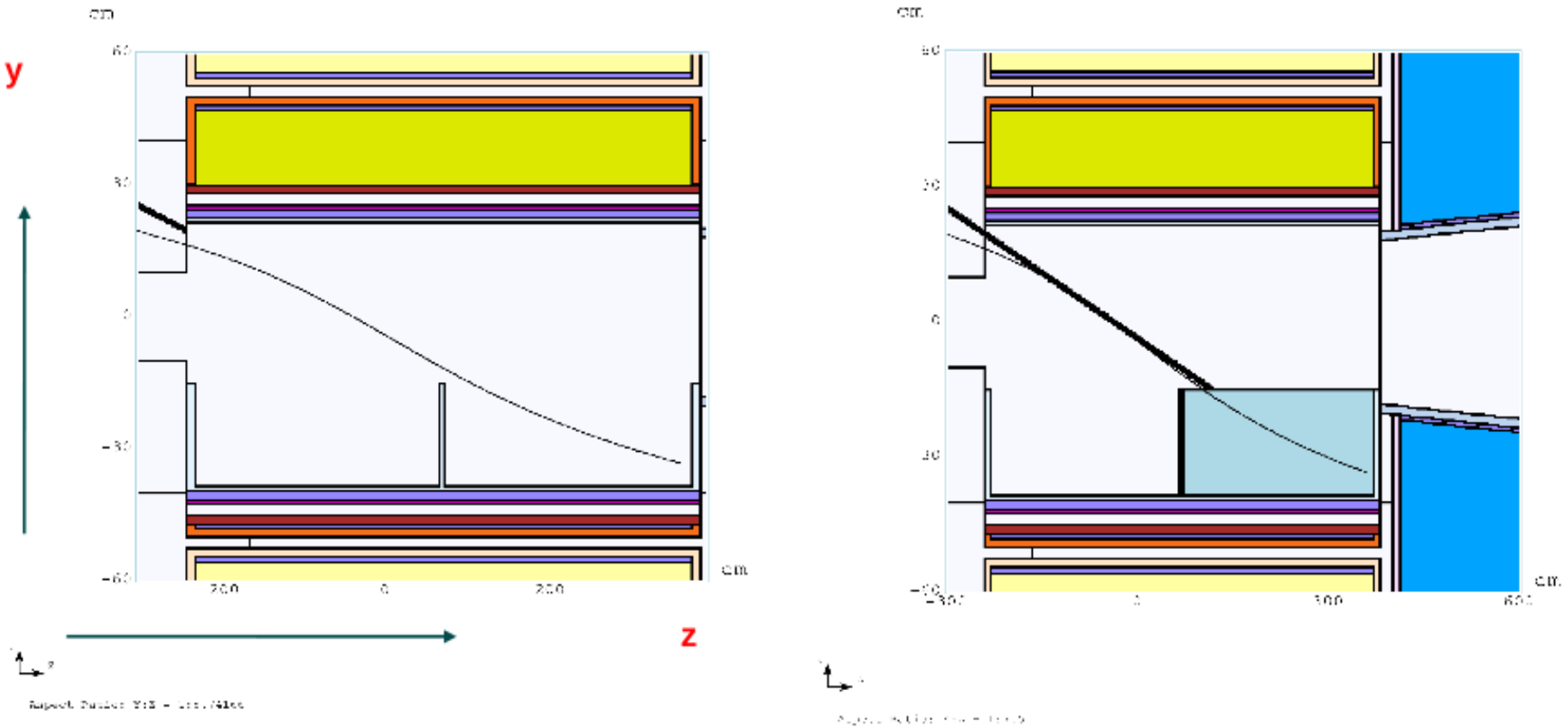


IDS120(?): **xz CROSS SECTION AT y = 0.0 cm [LEFT] AND xy CROSS SECTION AT Z=0.0 cm [RIGHT] WITH 6.75 GeV PROTON BEAM CENTROID TRAJECTORY INTERACTING WITH C TARGET / DUMP.**
RED LINE IS A PION+ THAT DECAY TO MUON+ AT Z ~ 16 m.





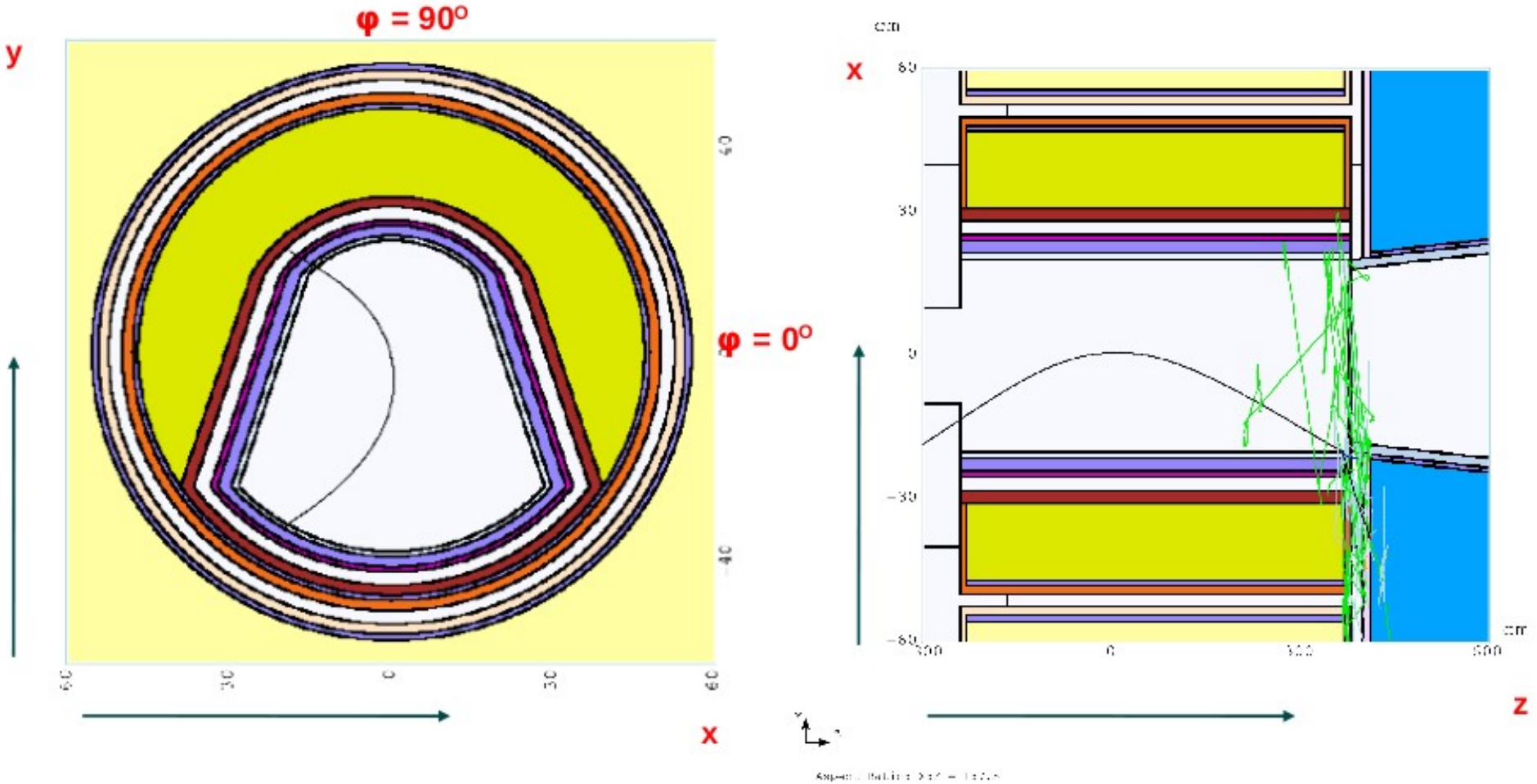
IDS120j: yz CROSS SECTION WITH THE PROTON BEAM CENTROID P12 TRAJECTORY SHOWING (RIGHT) AND WITHOUT SHOWING (LEFT) THE Hg POOL AND Hg JET.

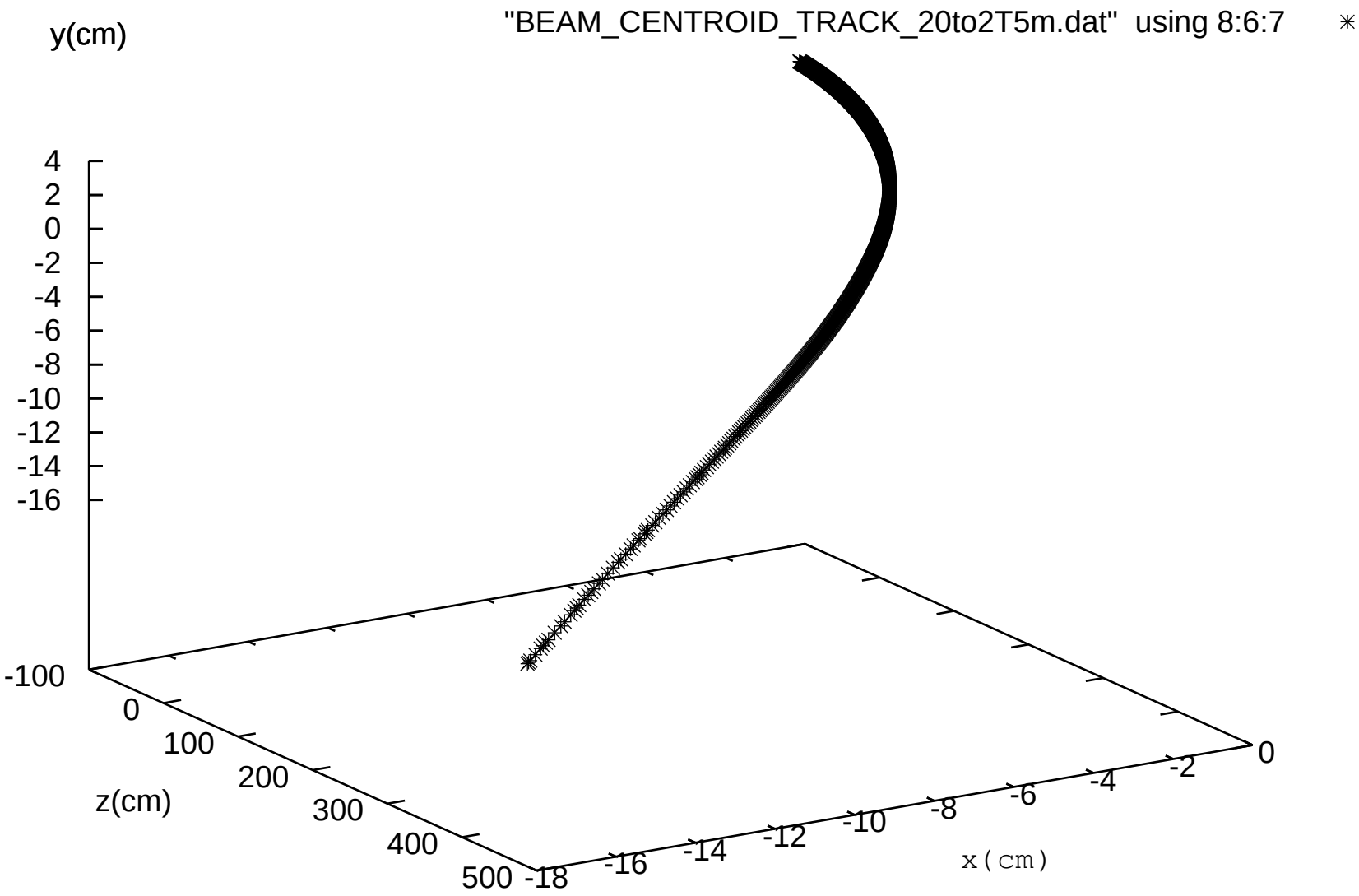


PROTONS ENTER THE Hg POOL AT (x, y, z) ~ (- 1.61, -15.00, 104.66) cm AND WILL BE STOPPED BY THE SIDE (SEMICIRCULAR) WALL AT (x, y, z) ~ (-19.39, -33.26, 358.80) cm (~ 10 cm BEFORE THEY REACH THE RIGHT SIDE FLANGE OF Hg MODULE) COVERING A DISTANDE ~ 255.41 cm ~ 17 IL (1 IL ~ 15 cm).
IS IT POSSIBLE FOR POOL TO BE SORTER AND FILL THE REST OF THE UPSTREAM VOLUME WITH SHIELDING ?

NOTICE : R1, HU (HL ?) DIMENSIONS OF Hg MODUL ARE DETERMINED FROM THE SPACE NEEDED FOR THE PROTON BEAM TRAJECTORY. DIFFERENT INJECTION POINTS WILL PROBABLY REQUIRE DIFFERENT VALUES FOR THESE PARAMETERS.

IDS120j: yx (AT z = 200 cm) (LEFT) AND xz (RIGHT) CROSS SECTION WITH THE PROTON BEAM CENTROID P12 TRAJECTORY.




"BEAM_CENTROID_TRACK_20to2T5m.dat" using 8:6:7
y(cm)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-100
0
100
200
300
400
500
z(cm)
-18
-16
-14
-12
-10
-8
-6
-4
-2
0
x(cm)